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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

1.0.2 It is the Army's objective that these buildings will have a 50 year useful life. 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 facility design should consider that the Army may repurpose the use of the facility over the 50 year life. The Army's intent is to install products and materials of good quality that meet industry standard average life that corresponds with the period of performance expected before a major renovation or repurpose. The design should be flexible and adaptable to possible future uses different than the current to the extent practical while still meeting the operational and functional requirements defined within. Flexibility is achieved through design of more flexible structural load-bearing wall and column system arrangements. The site infrastructure will have at least a 50-year life expectancy with industry-accepted maintenance and repair cycles. Develop the project site for efficiency and to convey a sense of unity or connectivity with the adjacent buildings and with the Installation as a whole.

1.0.3 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 300

Maximum gross area 109,900 square feet.

2.2. SITE:

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

Approximate area available 3.00 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: Electric ranges,vending machines and ice machines.

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. Provide elevator system that complies with the most current editions of ASME A17.1 and ASME A17.2 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 the most current editions 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 GFGI electric oven/range 30 inches wide, with a CFCI built-in combination 30 inch wide vent hood and microwave oven, centered over the space provided for the electric range, 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. Laundry area shall be in the kitchen area and shall be sized to accommodate GFGI full size Heavy Duty residential washer and dryer placed side by side, or GFGI stackable washer/dryer units in each dwelling unit. Provide required power, water, drain, and ventilation connections.

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. Not Used

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 located in an interior lobby (design and location shall conform to the requirements of ATFP UFC 4-010-01)

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. Not Used

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: Provide GE SupraSafe 2HSR or Suprasafe 1 (key type: Tital Code C4733) rapid entry key boxes on exterior of building on the left side and within 6 feet of 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 Lock Corporation, Arrow Lock Corporation. 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). The Installation does not have a single manufacturer established for this equipment at this time. 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.

3.4.2. 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

MAIL ACCESS AREA					●								8'-0"	IF LOCATED OUTSIDE BUILDING SEE NOTE 10
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 NOTES 2 AND 5
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)
10. CEILING SHALL BE PAINTED EXPOSED STRUCTURE

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 4C, Energy Conservation Features Table

Item	Component	Minimum Requirements
Roof	Attic	R-50
	Surface reflectance	0.27
Walls	Light Weight Construction	R-25
Exposed Floors	Mass	R-20
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-0.42
	Solar heat gain coefficient (SHGC)	0.46

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		yes
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

Hr	Refrigerator			Range and Oven		
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
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.

3.7.1.2. Maximum plumbing fixture flow rates:

Water closets: 1.28 gallons per flush or dual flush with an equivalent average flush volume of 1.28 gallons per flush.
Showers: 1.5 gpm
Bathroom sinks: 0.5 gpm
Kitchen sinks: 1.0 gpm
Janitor sinks: 2.0 gpm

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

3.7.1.4. Not Used

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. All dwelling unit HVAC units shall have piping and duct connections that allow quick and easy removal and replacement of individual units.

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.

3.8.2.5. Electrical service shall be provided for electric dryers regardless of whether or not electric dryers are to be used.

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.)
ASHRAE Standard 189.1	Standard for the Design of High-Performance Green Buildings (ANSI Approved; USGBC and IES Co-sponsored), - (APPLICABLE TO THE EXTENT SPECIFICALLY CALLED OUT IN THE CONTRACT)
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) SECRET Internet Protocol (IP) Router Network (SIPRNET) Technical Implementation Criteria (STIC).. 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 http://mrsi.usace.army.mil/rfp/Shared%20Documents/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. 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 at elevator shafts. Coordinate the motorized elevator hoistway vent damper(s) with the Fire Protection System design in paragraph 5.10. Ensure that the damper(s) is accessible to facilitate regular inspection and maintenance.

5.5.2.9. Damper and control to close all ventilation or make-up air intakes and exhausts, , etc., when leakage can occur during inactive periods. Atrium smoke exhaust and intakes shall only open when activated per IBC and other applicable Fire Code requirements.

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 Control 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 both pressurization and depressurization.. 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: Urinals shall be water-use type, conforming to ASHRAE Standard 189.1 (0.5 gpf/1.9 lpf).

5.6.8. BUILDING WATER USE REDUCTION. Reduce building potable water use in each building 30 percent from the Baseline ,using the Manufacturing Performance Requirements for .Plumbing Fixtures from the Energy Policy Act of 1992 (Public Law 102-486). See Appendix S.

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 and Telecommunications Equipment Rooms, (including SIPRNET ROOMS, where applicable for specific facility type). Comply with ANSI/EIA/TIA 569 (including applicable Addenda**)**. Maintain environmental conditions at the Class 1 and 2 Recommended Operating Environment. Before being introduced into the room, filter and pre-condition outside air to remove particles with the minimum MERV filtration quality shown in the ASHRAE HVAC Applications, Chapter 17. Maintain rooms under positive pressure relative to surrounding spaces. Design computer room air conditioning units specifically for telecommunications room applications. Build and test units in accordance with the requirements of ANSI/ASHRAE Standard 127. A complete air handling system shall provide ventilation, air filtration, cooling and dehumidification, humidification (as determined during the design phase), and heating. The system shall be independent of other facility HVAC systems and shall be required year round.

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.

(i) Provide on board nonvolatile memory for devices accumulating energy consumption.

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 (CxA), certified as a CxA by AABC, NEBB, or TABB, as described in Guideline 1.1. The CxA 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 CxA 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 JOINT BASE LEWIS-MCCORD (JBLM), WA

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.

None

6.3. SITE PLANNING AND DESIGN

6.3.1. Site Planning Considerations

6.3.1.1. Site Planning, Design, and Construction Objectives: The Contractor is responsible for the site planning, design, and construction of all functional and technical requirements listed in this project, including erosion control measures, underground conduit, piping, sanitary sewer facilities, storm drainage facilities, water mains, fire apparatus, utility service lines and connections (electrical, communications, cable, water, sewer, stormwater, propane/air,gas, mechanical), etc. The site plan shall comply with the Joint Base Lewis McChord (JBLM) Real Property Master Plan (Master Plan), available upon request from the Contracting Officer.

6.3.1.2. Sidewalks: Provide 6-foot-wide minimum paved walkways to the entrance(s) of the building, around the building perimeter or all areas within the building complex, including courtyards.

6.3.2. Site Structures and Amenities

6.3.2.1. Site Furniture and Equipment. Provide the following:

(a) Exterior seating, as shown on the drawings.. Fabricate seating and tables of corrosion and rot-resistant materials.

(b) Bicycle racks at all regularly occupied facilities with rack capacities consistent with LEED credit requirements. Provide individual loop style (inverted “U”) bicycle racks anchored in concrete and fabricated from 2-inch diameter powder-coated steel pipe.. Place all bike racks outside the unobstructed space per UFC 4-010-1.

(c) Fencing as indicated on drawings for security or safety barriers. Fencing shall be galvanized, vinyl coated, or aluminum-coated, chain-link with privacy slats.

(d) Physical barriers, including concrete filled steel pipe bollards and vehicle gates, as required by antiterrorism or traffic control design. Bollards and gates shall not require more than one person to remove or open. Bollards and gates shall have padlocks keyed to accept JBLM master key #750.

(e) Waste receptacle(s) and recycling receptacle(s), as shown on the drawings. Fabricate waste receptacles of durable, corrosion-resistant materials.

(f) Flagpoles are required at Brigade and Battalion Headquarters facilities. Provide free-standing poles, 25-feet in height above surrounding ground plane. Flagpoles shall resist a 3-second duration wind gust of 85 mph. Provide brushed natural aluminum, tapered from top to bottom, with 6-inch-diameter aluminum top ball.

(g) One concrete guidon pedestal for Company flag adjacent to each Company Readiness module.

6.3.3. Site Functional Requirements:

6.3.3.1. Stormwater Management (SWM) Systems.

(a) The Contractor is responsible for design, development, and installation of all stormwater facilities at their respective sites.

(b) Fort Lewis (JBLM) has adopted the Washington State Department of Ecology (Ecology) Western Washington Stormwater Management Manual (Ecology stormwater manual). By adoption, JBLM Department of Public Works (PW) is not transferring regulatory compliance of the design process to Washington State. Send all requests for exceptions from or clarifications of the requirements within the Ecology stormwater manual to JBLM PW for consideration. Use the most current version of the stormwater manual as a guide for stormwater designs.

(c) Management of stormwater must be integrated into other project aspects to meet the sustainability goals of the installation as a whole. Design stormwater systems to maintain the hydrologic functions of the site. Consider reusing stormwater on site for irrigation and landscaping. This contributes to the installation's water savings and reuse goals.

(d) Design and size stormwater facilities d to accommodate stormwater runoff from all site development surfaces and all runoff from buildings in conformance with the latest adopted edition of the Ecology stormwater manual. Design goals should be to reduce or eliminate offsite stormwater flows and restore the pre-development hydrology of the project area. Designs must meet all of the requirements below.

1. The designs must comply with Section 438 of the Energy Independence and Security Act (EISA).

2. Fence all standing water facilities with side slopes exceeding 3h:1v for safety. Complete all standing water facilities with a minimum of 6 inches of topsoil and plantings appropriate for the pond function.

3. Within housing, commercial, and organizational areas, ponds cannot be constructed with side slope exceeding 3h:1v or deeper than 2.5 feet.

4. All ponds, swales, or other like stormwater features must be vegetated and/or have amended soils added to provide appropriate function.

5. All ponds, swales, or other like stormwater features shall blend with project landscaping to the maximum extent practicable.

6. Storm drain lines and branches within the site shall be polyvinyl chloride (PVC) plastic, ductile-iron, CPEP, or HDPE pipe.

7. Infiltration rates (including topsoil and vegetation), amended or on-site soils mixes, and seed mixtures should all be addressed in the design.

8. Whenever possible, shrub beds, street plants, and similar features shall be used through rain garden type features for stormwater runoff management.

(e) Onsite treatment and infiltration: Use the Ecology stormwater manual and the Low-Impact Development Technical Manual for Puget Sound. Request any exceptions for approval by JBLM PW. However, consider the portions of Section 3.3 of Volume III of the Ecology stormwater manual pertaining to the methods for determining infiltration rates as a recommended guideline. Conduct on-site soil tests in conformance with standard engineering practices and to the satisfaction of JBLM PW. Use the soil tests to determine a short-term infiltration rate. Once determined, apply appropriate factors of safety in conformance with standard engineering practices to the short-term infiltration rate to arrive at a long-term design infiltration rate based on site conditions, in conformance with the designer's professional opinion and discretion, and the approval of JBLM PW, prior to full design. Include detailed information in the design regarding amended soil mixtures, soil depths, vegetation requirements and seed mixtures for all stormwater management features.

1. JBLM prefers stormwater infiltration methods that are small, distributed throughout the project site, and as visually unobtrusive as possible. Preferred methods include elements such as car parks, rain gardens, porous pavement, cisterns, or other low-impact development elements.

2. Use pervious pavements to infiltrate stormwater for parking areas in housing, commercial, and organizational areas that are not subject to industrial activities or high traffic. If there is runoff that the pervious pavement cannot infiltrate, use car parks or rain gardens to infiltrate this runoff. Car parks shall meet the car park standard for landscape and shading.

3. Use sheet flow runoff to infiltration features to the maximum extent practicable. Consider safety when sheet flowing large amounts of runoff.

(f) The use of underground injection control for stormwater management must meet the requirements of Chapter 173-218 of the Washington Administrative Code (WAC) Underground Injection Control (UIC) Program. Submit completed registration forms to the JBLM Stormwater Office for registration with Ecology 65 days prior to any construction of UIC facilities. Obtain registration forms and any further information from the JBLM Environmental Division.

(g) Low-impact development techniques shall comply with the Low Impact Development Technical Guidance Manual for Puget Sound.

Onsite treatment and infiltration: Use the Ecology stormwater manual and the Low-Impact Development Technical Manual for Puget Sound. Request any exceptions for approval by JBLM PW. However, consider the portions of Section 3.3 of Volume III of the Ecology stormwater manual pertaining to the methods for determining infiltration rates as a recommended guideline. Conduct on-site soil tests in conformance with standard engineering practices and to the satisfaction of JBLM PW. Use the soil tests to determine a short-term infiltration rate. Once determined, apply appropriate factors of safety in conformance with standard engineering practices to the short-term infiltration rate to arrive at a long-term design infiltration rate based on site conditions, in conformance with the designer's professional opinion and discretion, and the approval of JBLM PW, prior to full design. Include detailed information in the design regarding amended soil mixtures, soil depths, vegetation requirements and seed mixtures for all stormwater management features.

1. JBLM prefers stormwater infiltration methods that are small, distributed throughout the project site, and as visually unobtrusive as possible. Preferred methods include elements such as car parks, rain gardens, porous pavement, cisterns, or other low-impact development elements.

2. Use pervious pavements to infiltrate stormwater for parking areas in housing, commercial, and organizational areas that are not subject to industrial activities or high traffic. If there is runoff that the pervious pavement cannot infiltrate, use car parks or rain gardens to infiltrate this runoff. Car parks shall meet the car park standard for landscape and shading.

3. Use sheet flow runoff to infiltration features to the maximum extent practicable. Consider safety when sheet flowing large amounts of runoff.

6.3.3.2. Erosion and Sediment Control. Provide appropriate erosion and sediment controls on all construction sites that will have ground disturbance. Proper implementation and maintenance of appropriate best management practices (BMPs) is critical to control any adverse water quality impacts from construction activities adequately. Discharges must not violate the state's surface water quality standards (WAC Chapter 173-201A) and groundwater quality standards (WAC Chapter 173-200).

(a) Volume II, Chapter 4 of the Ecology stormwater manual provides standards and specifications for BMPs that are approved for use on JBLM. Consider other BMPs with proper review and approval by JBLM PW.

(b) Preparation of a site-specific SWPPP is required for all construction activities that will have a land disturbance of one or more acres (or are part of a common plan of development that will disturb an acre or greater). Multiple construction sites under one contract must have an SWPPP prepared if the total land disturbance for all sites is greater than one acre.

(c) Construction sites that will have a land disturbance of one or more acres (or are part of a common plan of development that will disturb an acre or greater) or projects that have multiple construction sites

under one contract if the total land disturbance for all sites is greater than one acre, must be covered under the EPA's NPDES CGP (Construction General Permit). See Permit Section 6.16 for details.

6.3.3.3. Vehicular Circulation.

(a) Parking Lot(s). The The Contractor will be responsible for parking lots for the facilities. POV parking requirements are shown in the Drawings. All POV parking lots shall meet car park standards per the Master Plan. All roadways, driveways and parking lots shall have curb and gutter.

(b) Fire Department (Emergency) Vehicle Access

1. All buildings greater than 5,000 square feet, or more than two stories in height, must have at least one means of all-weather ground access to allow emergency vehicles unimpeded access to the building. Pave all-weather ground access with concrete, asphalt concrete or pavers. Start from the road, and terminate no further than 33 feet from building.

2. Provide residential facilities with all-weather ground access to three sides, with a minimum of two sides having access to sleeping rooms.

3. Provide new facilities four stories or more in height and all new warehouses with suitable all-weather ground access surface for aerial apparatus on a minimum of two sides of the perimeter of the structure.

4. For facilities with fire department connections for sprinkler or standpipe systems provide suitable all-weather ground access surface for pumper apparatus within 150 feet of fire department connections.

5. Provide a minimum width of 20 feet for vehicle access.

6. 100 Ft Aerial Ladder Truck Access:

GVW: 75,500LBS

STABILIZERS: Two (2) sets of extendible, out and down, "H" type stabilizers for stability. The stabilizers will have a spread of 18 feet.

FRONT AXLE: The front axle will be a reverse "I" beam type with inclined king pins. It will be a Meritor™ axle, Model FL-943, with a rated capacity of 21,500 pounds. The turning angle will be 39 degrees to the right and 45 degrees to the left.

WHEELBASE: The wheelbase of the vehicle will be 254".

Ladder truck required for structures with an eve height or top of parapet, 33 feet or more in height.

a. Provide 28 feet of access parallel and adjacent to the longest side of the structure.

b. Provide required ladder truck access from the public street to the structure and return back to the public street. All turns associated with ladder truck access shall provide for minimum turning radii of 32 feet on the centerline.

c. Place the required ladder truck access a minimum distance of 5 feet from the exterior wall, including projections. Additional distance may be required due to ladder climbing angle and the hazard of falling debris from upper stories.

7. Padlock and key bollards, chains or painted curbs used to control fire department access to accept JBLM master key Best 750.

8. Do not place obstructions near fire hydrants, fire department inlet connections, or fire protection system control valves in a manner that would prevent such equipment or fire hydrants from being immediately visible and accessible. REF: National Fire Protection Act (NFPA) 1, Section 13.1.3.

9. Maintain a minimum 36 inches (914mm) of clear space to permit access to and operation of fire protection equipment, fire department inlet connections, and fire protection system control valves. Do not

deter or hinder fire department from gaining immediate access to fire protection equipment. REF: NFPA 1, Section 13.1.4.

6.4. SITE ENGINEERING

6.4.1. Existing Topographical Conditions

6.4.1.1. See the Drawings for topographic survey, demolition plan, site layout plan, site utility plan, and site grading plan drawings. Information shown is approximate. A three dimensional digital topographic file is included as part of this RFP. Obtain corrected survey data from any subsequent changes from the time the survey information was obtained to the present. Field verify surface and utility elevations. Use NAVD 88 datum for the vertical datum on all design and as-built submittals and verify that all information relied on for design utilizes NAVD 1988 vertical datum unless otherwise approved by JBLM PW. Locate all horizontal project information utilizing no fewer than two existing monuments tied into state plane coordinates. Provide new, permanent monumentation at all street intersections and section line intersections and provide USACE with state plane coordinates using NAD83 datum (horizontal) and elevation using NAVD 1988 on all installed monuments. Geospatial data files are available from JBLM PW. Bring any discrepancies which are found in the furnished survey to the immediate attention of the Government for clarification..

6.4.1.2. Site Grading: Provide site grading to facilitate drainage and provide functional building, parking, and laydown areas. Site grading includes clearing and grubbing for access drives, parking lots, and any site development. Protect and preserve mature trees shown on the plans. Provide all foundation, subbase, and building floor slabs, including final grading material and compaction.

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

6.4.3. Fire Flow Tests See Appendix D for results of fire flow tests to use for proposal purposes in estimating the basis of design for fire flow and domestic water supply requirements and for preparing the proposal cost estimate. Historical tests are not meant for design purposes. After award, coordinate with the Contracting Officer and JBLM Public Works to perform flow tests on the water system at the anticipated points of connection in order to provide up-to-date flow information during the design phase. Contractor shall also utilize sufficient factors of safety during design to account for fluctuation in water flow experienced at JBLM. If actual conditions vary sufficiently from those provided in Appendix D, which are the cause of a change in the design, an equitable adjustment (credit or increase, as appropriate) will be provided pursuant to the contract Changes clause.

6.4.4. Pavement Engineering and Traffic Estimates:

The Contractor shall be responsible for all roadway improvements and parking lots for the facilities, as shown on the drawings. Design procedures and materials shall conform to the applicable criteria. Provide on-street parking, continuous sidewalks, with pedestrian bulb-outs at intersections and planting strips along all streets as required by the Master Plan.

See the drawings in Appendix C and Appendix J for requirements.

6.4.5. Traffic Signage and Pavement Markings: Provide marked bike lanes on all roads per locations identified on the Master Plan. Provide pavement marking paints conforming to the most current version of Federal Specification TT-P-1952 unless otherwise authorized in writing by the JBLM Pollution Prevention Program.

6.4.6. Base Utility Information

6.4.6.1. General Utilities: Provide tracer wire directly above non-metallic lines and install marking tape. Exercise care when excavating trenches in the vicinity of trees. Where roots are 4-inches in diameter or

greater, excavate the trench by hand and tunnel. When large roots are exposed, wrap them with moist heavy burlap for protection and to prevent drying. Hand trim sides of trenches dug by machines adjacent to trees having roots less than 4-inches in diameter, making a clean cut of the roots. Backfill trenches having exposed tree roots within 24 hours unless adequately protected by moist burlap or canvas. Exercise care to avoid compacting and polluting the soil in the root zone of trees to remain. Exercise care to minimize damage to tree trunks and branches by installing a temporary fence around each tree at its drip line.

(a) Provide meters with equipment to connect to DDC/BAS/UMCS capabilities for monitoring utility use and leak detection by JBLM. Hardwire the meter connections to the DDC/BAS/USMC to the DDC system; the wireless type (called out in Paragraph 5) is not acceptable.

(b) Electrical Service Maps: JBLM Public Works, Exterior Electric Shop owns and operates the electrical distribution system. Point of Contact: Mr. Jose L Solis, Electrical System Manager Engineer, 253-966-0143; and Mr. Ron Cottrill, 253-967-5840.

(c) Telecommunications: The National Enterprise Center (NEC), operates the Army communications system at Fort Lewis. Point of Contact: Mr. Gary Schroeder; 253-967-3870 or the MCA Info Tech PM Specialist, Mr. Michael C. Pope, 253.966.2828.

(d) Security: Coordinate physical security requirements through JBLM Physical Security. Point of Contact: Mr. Criss Christian, 253-966-7153.

(e) Cable TV Service: Comcast provides Cable TV service . Point of Contact: Mr. Terry Britton, Engineering Construction Coordinator, Comcast Cable, 410 Valley Avenue NW, Building C, Puyallup, WA 98371, 253-864-4293. Coordinate with Comcast during the design process.

(f) Qwest provides local telephone service at JBLM. Point of Contact: Ms. Leslie Ferguson, Senior Design Engineer, Qwest Communications, 2410 South 84th Street, Suite 18, Lakewood, WA 98499, 253-597-4033. Coordinate with Qwest during the design process.

(g) Exterior Utility Installation: Install utilities prior to paving, where new utilities cross roads, driveways, and parking lots to be paved under this contract,

(h) Install utilities beneath existing streets, using jacking or boring, as identified on the drawings unless otherwise approved. If open cutting of streets is shown on the drawings or approved, provide a minimum patch width of 15 feet of new pavement..

6.4.6.2. Sanitary Sewer Service

(a) General: To demonstrate the integrity of the installed material and construction procedures, the the Contractor shall conduct final air testing after installation and prior to paving, . Allowable pressure drop shall be as given in ASTM C 924. Make calculations in accordance with the appendix to ASTM C 924. For PVC pipe, the testing shall be in accordance with UBPPA UNI-B-6. Allowable pressure drop shall be as given in UBPPA UNI-B-6. Make calculations in accordance with the appendix to UBPPA UNI-B-6. For ductile iron pipe, the testing shall be in accordance with the applicable requirements of ASTM C 924. The Contractor may be required to retest the system if warranted by the contracting agency. Once the sub-grading is accomplished, all other underground utilities have been installed, the lines have been flushed, cleaned, and air-tested, and the site is ready to be paved, TV system to test for deflection and bellying. The Contractor shall remediate any problem areas to the satisfaction of JBLM PW prior to site paving.

(b) Prior to final inspection, test, flush, clean, and remove all debris from all pipelines**.** Flush a pipeline “cleaning ball” of the proper diameter for each size of pipe through all pipelines prior to final inspection.

(c) Before sewer lines are accepted, conduct a closed-circuit television inspection, using color video equipment with pan-and-tilt capabilities of the sewer pipe and appurtenances in the presence of the Contracting Officer, and provide two copies of the video media to the Contracting Officer.

(d) Not Used

(e) Install a boot/equipment wash system, adjacent to a building entrance/exit door. Discharge the boot wash system to the sanitary sewer system. Site it to minimize rain intrusion, and install an adequate

oil/water/grit separator system to prevent direct discharge of non-sanitary waste into the collection system.

6.4.6.3. Water Service

(a) **General:** Provide material for and install water system for domestic use and to provide required hydrant flow to meet NFPA 24, NFPA13 and UFC 3-230-02 Operation and Maintenance Water Supply Systems. NFPA 13 requires clearances around the main riser to prevent damage of piping subjected to earthquakes. Provide fire lines of cement-lined, Class 52 ductile-iron pipe water main pipe. For water services other than fire lines, provide PVC C900 or Class 52 DIP. Provide water service appurtenances as required. Do not install utilities under the footprint of a building, other than the building they are designed to serve. Supply a fire-line off the domestic water main with PIV with tamper switch per NFPA 24 standards to supply the building's interior fire suppression system. Terminate fire line(s) at 5 feet from footprint of building. Install the fire riser from 5 feet outside the footprint of the building, including the 90-degree bend and flange. Tap each water service directly from the main serving the building. Fire lines and potable lines shall not share a dead-end main extension.

(b) Pressure test all tapping sleeves and tapping valves prior to making connection to existing mains.

(c) If backflow prevention devices are required for installation on the distribution system, add the following references to the specifications.

- American Water Works Association (AWWA)
- Cross Connection Control Manual (latest edition)
- Cross Connection Control Committee, Pacific Northwest Selection
- WAC 246-290-490, Cross Connection Control

(1) Backflow prevention assemblies shall be approved by the Washington State Department of Health (DOH) for installation in Washington. The most current list of approved assemblies is available from the DOH test reports, showing the name of the manufacturer of the BPA, the manufacturer's serial number, test date, test results, tester's name, and tester's certificate number.

(2) Reduced pressure principle assemblies, double-check valve assemblies, atmospheric (nonpressure) type vacuum breakers, and pressure-type vacuum breakers shall be tested, approved, and listed in accordance with FCCHR-01 and in accordance with DOH standards. Backflow preventers with intermediate atmospheric vent shall conform to ASSE 1012. Reduced pressure principle backflow preventers shall conform to ASSE 1013. Hose connection vacuum breakers shall conform to ASSE 1011. Pipe applied atmospheric-type vacuum breakers shall conform to ASSE 1001. Air gaps in plumbing systems shall conform to ASME A112.1.2. Backflow devices must be approved by DOH for installation in Washington .

(3) All testable backflow prevention assemblies (reduced pressure backflow assembly, double-check valve assembly, and pressure vacuum breaker) shall be tested and a test report form shall be completed, and submitted to the Contracting Officer (to be forwarded to the installation water systems manager). Test procedures and criteria shall be in conformance with recommendations published in AWWA Cross Connection Control Manual, Section 6, Requirements for Equipment Approval and Testing. Fittings in areas shown on the plans for restrained joints shall be mechanical joint fittings with a mechanical joint restraint device. The mechanical joint restraint device shall have a working pressure of at least 250 psi with a minimum safety factor of 2:1.

(d) Install hydrants with 6-inch shutoff gate valves for easy maintenance and service. Fit fire hydrants with 5-inch Stortz adapters. Provide hydrants in accordance with UFC 3-600-01 and NFPA 24. At least one hydrant shall be located within 150 feet of the fire department connection. Locate hydrants at least 40 feet from the building to be protected. Where hydrants cannot be located at least 40 feet from the building, locations closer than 40 feet from the building or wall hydrants shall be permitted to be used where approved by the authority having jurisdiction. Locate hydrants between three to seven feet from a paved traffic rated surface. Do not locate hydrants closer than 10 feet to any obstruction or near an entranceway. Install the 5 inch suction connection perpendicular to the nearest roadway. As required, provide protection for fire department connections (FDCs) from vehicular damage.

(e) The flow tests were conducted in the vicinity of the project sites and can be found in Appendix D. Any additional flow testing shall be the responsibility of the Contractor for the Contractor's portion of the development activity. Conduct any additional water flow testing in accordance with NFPA 291, Recommended Practice for Fire-Flow Testing and Marking of Hydrants. Collar the hydrant barrel with one reflective metal backed collars and number to provide pumper operators with an indication of available flow. Classify hydrants in accordance with their rated capacities (at 20 psi residual pressure or other designated value:

Class AA – Light blue - rated capacity of 1,500 gpm or greater (5,680 L/min)
Class A – Green - rated capacity of 1,000 to 1,499 gpm (3,785 to 5,675 L/min)
Class B – Orange – rated capacity of 500 to 999 gpm (1,900 to 3,780 L/min)
Class C – Red – rated capacity of less than 500 gpm (1,900 L/min)

(f) Paint hydrant barrels red for non-potable water/Color Code 11120 and Chrome Yellow for potable water/Color Code 135916.

(g) If not already in place, secure a blue double-sided reflectorized raised pavement marker in the road and organizational parking areas near center line for each hydrant. In addition to collaring, install a metal tag on each hydrant that indicates the hydrant number, with the Global Positioning System (GPS) location. Establish a GPS location for each fire hydrant. This tag will provide a secondary indicator to operator should the marking be removed. Submit hydrant test and installation report to the Contracting Officer (to be forwarded to the installation water systems manager).

(h) All water meters shall be read in US gallons, have frost protection design, have bronze casing and have permanently sealed registers. Register type shall be an encoder-type remote register designed in accordance with AWWA C707. Supply and install all domestic water meters needed for each project site. Provide water meter with equipment to connect to DDC/BAS/UMCS system for monitoring by JBLM

(i) Meter boxes shall be concrete with cast-iron lid and cast-iron meter reader lid. Use plastic boxes and lids only in unpaved areas or grass areas not subject to vehicular traffic.

(j) Demolition of existing water utility systems requires a cut and cap plan to be submitted for approval to JBLM PW Business Operations Integration Division (BOID). This is a prerequisite for any utility outage work requests needed in support of the demolition work

(k) PW shop support with turn-offs: Notify and schedule with all affected water customers for utility outages. Water system valve work on the operational utility system is restricted to Government personnel only. Contact JBLM PW Utility Division no later than 15 business days prior to the date of outage to schedule support for turnoffs.

(l) All new water system connections require a water connection permit completed prior to receiving an authorized connection date. Permits are available from the JBLM PW Environmental Division. As part of the permitting process, the Contractor shall be prepared to present flushing, chlorination, and bacteriological testing procedures with JBLM Water Plant personnel (253-967-2527) and the Water Systems Manager with PW BOID. Approved designs are required prior to receiving a connection permit. Modifications prior to connection require additional permit coordination.

(m) Hydrants for construction work and backflow preventers: Coordinate with PW BOID if hydrant water is needed during construction (including filling trucks).The Contractor will be assigned a hydrant, but the Contractor shall supply an approved backflow device and have it tested installed. If it is removed and reinstalled, it must be retested.

6.4.6.4. GAS SERVICE

(a) General: Puget Sound Energy (PSE), 888-321-7779, owns and operates the gas distribution system on JBLM. Therefore, local utility standards as determined by PSE for installation of natural gas facilities shall take precedence over any references made in this document to natural gas facilities installation methods, means, and materials. Provide all meters with a pulse meter sensor compatible with the JBLM DDC/BAS/UMCS system for monitoring. Coordinate and contract with PSE for the installation of the natural gas piping up to and including the meter to all facilities at their respective sites. Include the

PSE's installation cost, including meter, in the contract price. Provide the meter with equipment to connect to DDC/BAS/UMCS system for monitoring. See Appendix C for exhibit representing the location of the existing natural gas main.

(b) Gas Line Locations: Anticipated gas line locations are identified in Appendix C of this RFP. Provide protection for gas meters from vehicular damage.

(c) Propane Fuel Distribution System: JBLM owns and operates the propane-air fuel distribution system. Install the propane facilities with a minimum separation of 36 inches from PSE's natural gas pipe. Connect piping downstream of the building's natural gas meter to the back of sidewalk along the street and cap piping so that connections can be made in the future to the propane-air distribution system. Pipe installers shall be qualified under 49 CFR 192 and submit copies of certification for government approval. Coordinate with utility provider to identify the required color of pipe to distinguish the two facilities.

(d) Utility Pads: Install all concrete utility pads located outside the building exterior for any mechanical or utility device needed for the building operation and function. Include all necessary piping, wiring, or utility extensions for the device to function as designed. Locate mechanical equipment adjacent to existing or proposed sidewalks (other than sidewalks along public roads). Screen mechanical units on a minimum of three sides. Screening shall consist of landscaping that, when mature, will hide equipment from view or with masonry or other prefinished decorative screen walls consistent with the appearance of the building. Wood fencing, metal siding, or chain link fencing with privacy slats are not acceptable. All utility pads with equipment shall meet antiterrorism/force protection standards.

6.4.7. Cut and Fill

Cut and fill should equal out where possible.

6.4.8. Borrow Material

6.4.8.1. Contractor is authorized to remove and use previously excavated soils stockpiled in the JBLM borrow source pits for JBLM projects only, per the requirements below. Material excavation and removal is not authorized without written approval from the contracting officer. Obtain mined material from licensed and permitted sources off government property. If seeking to utilize borrow pits on JBLM:

(a) Contact the JBLM Solid Waste and Recycling Program Manager for borrow pit use and activity authorization (253-966-6452).

(b) Submit a completed JBLM Borrow Source Entry Notification form for the acceptance or removal of soil from borrow source pit. Submit to the JBLM Solid Waste and Recycling Program Manager (253-966-6452) for review and approval. Obtain approval prior to the deposit or removal of any soil from a borrow source pit on JBLM.

(c) Perform proctor tests on borrow material in accordance with ASTM D 1557.

(d) Secure training area/range accessibility through the JBLM Directorate of Plans, Training, Mobilization, and Security (DPTMS), Range Control (253-966-5060).

(e) Secure an installation digging permit (see Appendix S of JBLM Regulation 200-1).

(f) Return location to same or better condition after operations (smooth contours, remove trash, grade steep slopes).

(g) Before use of borrow pits on JBLM YTC, activation must be coordinated through PW (Building 810, 509-577-3400) and PW Environmental Division (ED) (Building 810, 509-577-3545), and occur prior to use of the site.

6.4.8.2. Contractor may alternately obtain mined material from licensed and permitted sources off government property.

6.4.8.3. See 6.17.2 for disposal of material.

6.4.9. Haul Routes and Staging Areas

Adhere to the haul route and laydown areas as directed by the Contracting Officer. Laydown areas are shown on drawings in Appendix C. Restore the laydown areas to their original condition after construction is complete.

6.4.10. Clearing and Grubbing:

(a) Clear and grub all trees and vegetation as shown on plans for construction, but save as many healthy trees as possible. Consider alternatives of the site orientation to preserve existing trees. Unless otherwise noted, hire a qualified tree specialist (International Society of Arboriculture (ISA) certified arborist, urban forester, or horticulturist) to determine the health and safety of trees. Remove any hazardous trees as determined by the tree specialist. Protect trees within the project site limits by a fence around a tree directly under its outermost branch tips. Crown-prune existing trees to be preserved to remove all dead, broken, or crossing branches within the crown of the tree. Accomplish pruning by trained and experienced personnel in accordance with ANSI A300. Remove all flagging, paint, hardware, or other man-made products from trees to remain prior to completion of landscaping. Replace any existing vegetation designated to remain that is damaged during the work under this contract in kind with a minimum 5 feet high, in accordance with Section 01 57 20.00 10, Environmental Protection.

(b) All timber removed from the project shall remain the property of the Government, unless otherwise indicated or specified. Pile merchantable trees in a neat, limb-free deck for subsequent disposal by the Government. Pile coniferous tree stems separately from deciduous tree stems. A merchantable tree is defined as a tree with a small end diameter of at least 4 inches and 16 feet in length. Cut trees from the stump and limb (flush to the trunk) out to a 4-inch diameter. Top trees at 4-inch diameter and from this point to the top of the tree shall be considered non-merchantable (slash). Whenever possible, do not cut trees into log lengths. If trees are too large to be handled at full length, cut 41-foot logs from the butt end until a manageable length is achieved. Pile tree length logs separately from all shorter material (cut and broken logs). Locate piles as directed by JBLM and Forestry office. Locate piles so as not to interfere with construction work and so they will be accessible at a later date for disposal action. Piles shall be stable and not exceed 8 feet in height.

(c) To maintain the highest potential cost recovery to the Government, fell and buck trees into preferred lengths prior to removing them from the site for storage. Preferred lengths are as follows: 41 feet-10 inches, 38 feet 10 inches; 36 feet10 inches; or 32 feet 10 inches. Acceptable lengths include 2-foot multiples less than 32 feet-10 inches down to 16 feet-10 inches. Merchandise all logs down to a 4-inch top. Merchanise log lengths to exclude volume defects.

(d) Remove material and soils to be stripped or grubbed to a depth recommended by the Contractor's geotechnical engineer. Remove tree stumps by grinding to a minimum depth of 18 inches below designed subgrade surface or original ground surface, whichever is lower. If the stump is within the dripline of a tree to be preserved, grind the tree stump to designed subgrade level only. Fill depressions made by grubbing with satisfactory soil unless further excavation or earthwork is necessary. Restore damaged areas not scheduled for clearing/grubbing to their original condition, as acceptable to Contracting Officer. Leave the work site in a clean and sightly condition, free from litter and debris.

6.4.11. Landscaping:

The Contractor is responsible for the landscaping in accordance with UFGS 32 93 00 Exterior Plants outside the building construction limits For Barracks only the Building Contractor shall provide landscaping within the building pad construction limit and the SDC will provide the landscaping outside the building pad construction limit.

6.4.11.1. Tree Preservation Plan: Protect and preserve trees noted on the drawings. Provide a Tree Preservation and Protection Plan to the Contracting Officer for approval before any clearing and grading can take place. The Plan shall conform to JBLM's Urban Forest Management requirements included in Appendix AA.

6.4.11.2. Preserve Oregon White Oak trees (Quercus garryana) that have a diameter of 6 inches or greater. Replace oak trees that cannot be preserved at the ratio of six new Oregon White Oaks for every one removed. In accordance with the attachment entitled “Attachment for Joint Base Lewis-McChord Oregon White Oak Planting Plan” included in Appendix AB. Contact the Contracting Officer for guidance on locations for planting new oak trees.

6.4.11.3. Existing Plant Materials: Make every effort to preserve and protect existing plant materials, particularly mature trees, as shown on the drawings. Protect the root zone and foliage of materials being retained with temporary fencing. Install temporary fencing as indicated on plans or outside the drip line of trees or plant materials to retain. Where trees and other vegetation must be cleared from a site, mark trees and confirm planned clearing with the Contracting Officer prior to cutting.

6.4.11.4. New Plant Materials: Use only drought tolerant and insect and disease resistant species native to and/or adapted to western Washington. Review Appendix I for lists of acceptable and prohibited plant materials. Provide trees, shrubs, groundcovers and grasses consistent with existing plantings. Minimize the use of turf areas except at required parade and marching areas. Provide soil amendments and fertilizers to ensure successful plant establishment. New plant materials shall meet the following criteria.

(a) Able to withstand weather extremes likely to occur in any 10-year period without supplemental irrigation or seasonal protection.

(b) Acclimated to western Washington for a period of one growing season.

(c) Low-maintenance varieties without significant pruning and thinning requirements.

(d) Plant trees and shrubs in locations that will avoid contact with buildings, lighting and utilities when mature.

(e) Shrub beds, street plants, and similar features shall be suited for stormwater runoff management whenever possible. Use the most current version of the *Low Impact Development Technical Guidance Manual for Puget Sound or similar* low impact development (LID) manual for design and specifications.

(f) Tree planting: Excavate planting holes, with vertical sides and with bottom of excavation slightly raised at center to provide proper drainage. Make excavations at least 2 times wider than rootball spread. Set top of root ball slightly higher than surrounding finish grade. Planting backfill soil mix shall be as follows: 1/4 compost material, 1/4 topsoil and 1/2 soil excavated from planting pit. Stake/guy trees and form watering basin in topsoil around tree. Provide 6 foot diameter mulch ring and base of tree.

(g) Plant sizes and conditions in accordance with the latest edition of ANSI Z60.1 American Standards for Nursery Stock. Minimum plant sizes are as follows:

1. Deciduous trees: 2-inch caliper
2. Coniferous trees: 6 to 8 feet tall
3. Large shrubs: 3-5 gallon containers
4. Small shrubs: 1-3 gallon containers
5. Perennials and ornamental grasses: I gallon container
6. Groundcovers: 1 gallon container
7. Wetland/herbaceous plants: 10 inch tube plug

6.4.11.5. Warranty. Guarantee furnished plant material to be in a vigorous growing condition for a period of 24 months regardless of the contract time period. Replace a plant one time under this guarantee. Transplanting existing plants requires no guarantee.

6.4.11.6. Landscape Design: Provide landscaping schemes that are consistent with the function of the facility, contextually compatible with existing landscape design in the vicinity, and in accord with the

sustainable design goals of the project. Provide continuity with existing landscapes, including continuation of adjacent lawns, shrub beds, street tree plantings, and similar features. Provide landscaping over all site areas not covered with buildings, pavement, or other non-vegetative surfacing. Landscape design should provide a professional and natural appearance to all sites while minimizing water consumption and the amount of recurring labor necessary for maintenance. Design shall incorporate the following.

(a) Conformance with antiterrorism design standards.

(b) Screening of parking, service areas, and utility equipment from adjacent streets.

(c) Landforms and practices consistent with minimization of erosion.

(d) Edging strips to separate lawn areas from shrub beds and 2-foot gravel beds at foundations of buildings.

(e) Mulch at all tree plantings, shrub and ground cover beds.

(f) Street and parking lot trees as required by the Master Plan

(g) Consider Sight Vision Clearance and Sight Distance near intersections. Landscaping shall not obstruct vision or hinder the safety of motorists at intersections and driveways.

(h) Consider Utilities. Consider overhead power lines or underground utilities.

(i) Consider drainage. Landscape features shall not obstruct drainage or cause undesirable drainage issues.

6.4.11.7. Irrigation Systems: Use potable water to provide temporary irrigation necessary to maintain plant materials until established. Disconnect temporary irrigation systems used for plant establishment from potable water sources within 18 months of installation. Where captured rainwater, recycled wastewater, recycled greywater, or water treated and conveyed by public agency specifically for non-potable uses is available, permanent irrigation systems are acceptable. No permanent potable water irrigation systems are permitted. Where non-potable systems are used, irrigation system components shall be color-coded purple for reclaimed water.

(a) Irrigation control shall be automatic, easily programmable for weekly adjustment, and capable of providing separate frequency, time and duration settings for each zone. Locate all controllers in facility electrical rooms in a common wall area. Do not locate irrigation equipment within turf areas to receive foot traffic. Prevent contamination of potable water by irrigation water.

(b) Design irrigation systems to minimize the risk of damage from freezing. Provide connections at the head end of systems to accommodate seasonal evacuation of water using air pressure. Provide manual drain valves to gravel basins as required for drainage.

(c) Underground irrigation piping shall be PVC Schedule 40 plastic pipe or polyethylene plastic pipe for drip systems. Sleeve all pipes when crossing hard surfaces or where there is vehicular traffic. Sleeve material shall be PVC Schedule 40 for walk or drive crossings for light to medium weight vehicles and Schedule 80 for heavy truck or tank crossings. Use overhead spray (gear, rotor or rotator) heads at lawn areas and drip emitters, integral dripper lines or overhead spray heads at tree, shrub, and groundcover beads. Drip irrigation may also be considered in conformance with paragraph 6.4.11.7.

(d) Irrigation Capacity: Sufficient to establish landscape plantings with maximum contribution by precipitation equal to the Precipitation Allowance.

1. Precipitation Allowance: 25 percent of normal rainfall, maximum, in any month.

2. Application Rate: On average, apply 1 inch of water per week during establishment period..

3. Irrigation Efficiency: 62.5 percent minimum for overhead irrigation and 92.5 percent minimum for drip or other low volume systems, of applied water actually reaching plants, under normal climatic conditions.

4. Locations of Irrigation Equipment: To provide complete coverage of landscaped area requiring irrigation, without excessive overspray or runoff onto pavements, buildings, or un-irrigated planted areas.

5. Variation in Application Rate at Individual Locations: Head to head coverage or point source distribution varying not more than 25 percent. Use pressure compensating devices to ensure uniform output

6. (Sloped Areas: Prevent drainage out of lower outlets. Adjust programming to avoid runoff.

(e) Irrigation plans and specifications shall identify the materials to be used and the construction methods.

(f) Irrigation plans and specifications shall consider the soil type, slope, and other site characteristics to minimize water waste.

(g) Design the system to minimize free flow conditions in the event of main line damage or other mechanical failures.

(h) The irrigation plans and specifications shall require the system installer to conduct final system testing and adjustments to achieve design specifications prior to final acceptance of the system.

(i) Provide post construction documentation (as-built drawings) and recommended maintenance activities and schedules. Provide the operation schedule, designed precipitation rates, water shut off methods, operational guide for irrigation equipment installed, and any adjustment keys or tools.

6.4.11.8. Water Conservation: All landscape design shall incorporate water conservation consistent with JBLM regulation 11-5 for reduction of water consumption. Provide design consistent with the following:

(a) Use potable water to provide temporary irrigation necessary to maintain plant materials until established .

(b) Coordinate irrigation design with plant selection requirements..

(c) Minimize water usage through appropriate plant selection, soil amendment, efficient irrigation, and mulching.

(d) Provide irrigation for street trees on separate drip irrigation valved sections from lawn areas.

(e) Irrigate plants in hydrozones grouped by different water needs for ease of water application..

(f) Calculate a landscape design's total estimated water use by determining the estimated water use for each hydrozone and adding the estimated water use for all hydrozones together. The sum of all hydrozones is the landscape's total estimated water use. Indicate water use on irrigation plans.

(g) The evapotranspiration rate for the Puget Sound lowlands region is 14.49 inches per irrigation season.

(h) Average hydrozone based on relative areas of each, using plant factors as follows::

(1) Native Plants: Defined as plants that grow in the wild in natural local climate, or other plants and turf of equivalent climatic endurance requiring no supplementary irrigation; plant factor of 0 (zero).

(2) Low Water-Using Plants: Plants proven to be able to survive significant periods without water in the local climate without degradation of appearance; 0.0 to 0.3.

(3) Moderate Water-Using Plants: Plants proven to be able to survive periods without water in the local climate but with significant degradation of appearance; 0.4 to 0.6.

(4) High water use plants, including flowering plants when in flower: 0.7 to 1.0.

(5) Moderate Water-Using Plants: Plants proven to be able to survive periods without water in the local climate but with significant degradation of appearance; 0.8.

(6) Flowering Plants, when in Flower: 1.20.

(7) Area within Drip Line of Trees: 1.0; regardless of other type of planting.

(8) All irrigated turf grass: 1.0

(i) Irrigation Efficiency Value: Conventional overhead spray irrigation = 0.625, drip and other low volume irrigation systems = 0.925.

6.4.11.9. Topsoil: Provide topsoil, whether native from the site or imported, for landscaped areas meeting ASTM D 5268; natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles, conforming to USDA classification for Loam or Sandy Loam; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 3/4 inches in any dimension; and free of weeds, roots, and other deleterious materials. Topsoil shall meet the following requirements:

(a) Topsoil textural particle composition requirements, percentage by mass:

1. Sand (0.05mm to 2.0mm) 30% to 50% of total
2. Silt (0.002mm to 0.05mm) 30% to 50% of total
3. Clay (Less than 0.0023mm) 8% to 20% to total
4. Gravel (Larger than 2.0mm) 5% maximum of total
5. Organic material: 6% to 20% of total

(b) Saturation extract concentration for boron: less than 1.0.

(c) PH range of from 6 to 8 (plus 0, minus 0.5).

(d) . Saturation extract conductivity: less than 4.0 dS/m @ 25 degrees Celsius as determined in a saturation extract.

(e) Non-soil components: less than 1 percent by volume

(f) Heavy metal concentrations: below the Washington State Department of Agriculture (WDSA) year load limit.

(g) Minimal weed seed.

(h) Perform soil tests of native and imported topsoil to establish chemical, mechanical, and nutrient character. Amend the backfill topsoil mix for landscaped areas for improved plant growth and water holding capacity as indicated by the soil test. Provide sufficient topsoil material for landscape plant establishment, ease of maintenance requirements and longevity of successful landscape design. Provide minimum topsoil depth of 8 inches at all lawn and field grass areas. Provide minimum topsoil depth of 18 inches at all shrub and ground cover beds.

6.4.11.10. Mulch: Place mulch to a minimum depth of 3 inches. Provide standard commercially produced, medium-course, bright bark mulch. Bark shall be of uniform color, free from weeds, seed, sawdust, and splinters and shall not contain resin, tannin, or other compounds detrimental to plant life. All material shall pass a 1-inch mesh screen. Inorganic mulches may be used with Contracting Officer approval.

6.4.11.11. Apply hydromulch using the recommended rate of an organic tackifier. Hydromulch shall be free of weeds and promote germination and seedling establishment. Erosion control blankets shall be used whenever reclaiming slopes greater than 3:1 or along drainage areas where erosion is probable. Do not use bark as hydromulch.

6.4.12. Turf:

6.4.12.1. General: Provide turf areas only where indicated on the plans.

6.4.12.2. New Sod**:** All sod shall be locally grown and state-certified as classified by applicable state laws and industry standard. Provide soil amendments and fertilizers to ensure successful turf establishment. Establish and maintain a healthy stand of turf.

(a) Provide sod free of thatch, diseases, nematodes, soil-borne insects, weeds or undesirable plants, stones larger than 1 inch in diameter, woody plant roots, and other material detrimental to a healthy stand of turf.

(b) Dry moldy, yellow, irregularly shaped, torn or uneven end sod pieces are not acceptable.

(c) Sod shall be machine cut to a uniform thickness of 1 inch within a tolerance of 0.25 inch, excluding top growth and thatch.

(d) Measurement for thickness does not include top growth and thatch.

(e) Use sod anchors for sloped areas as recommended by the sod supplier.

6.4.12.3. Seed Mixes: Provide certificates for each grass seed mixture, stating botanical and common name, percentage by weight, and percentages of purity, germination, and weed seed. Certify that each container of seed delivered is fully labeled in accord with Federal Seed Act and equals or exceeds specification requirements. Deliver seed in standard sealed containers labeled with producer's name and seed analysis, and in accord with US Department of Agriculture Rules and Regulations under Federal Seed Act. Provide soil amendments and fertilizers to ensure successful seed establishment and to maintain a healthy stand..

(a) Provide seed that does not contain mold or is otherwise damaged.

(b) Provide seed that does not contain amounts of weed or crop seed greater than 1 percent by weight of the total mixture and free of restricted or prohibited noxious weed seed. Inert matter may not exceed 3 percent by weight of the total mixture.

(c) Seed mix for general purpose seeding shall be composed of low growing perennial rye grass (approximately 70% by weight) and turf-type fescue grass (approximately 30% by weight) blends or three-way perennial rye grass blends as available from regional seed suppliers.

(d) Water quality, wetland, and restoration seed mixes as available from regional seed suppliers if required. Ecology and meadow mixes may only be used with Contracting Officer approval prior to installation.

(e) Seeding for non-irrigated turf areas shall take place in normal weather and temperatures that are appropriate and typical for such work between March 1 and April 15, and September 1 and October 15. Seeding on other dates or during adverse conditions is at the risk of the Contractor.

(f) Sample the hydroseeding mix at the beginning of each application. Test each to ensure it meets the requirements of this section.

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 and shall conform with the Master Plan and the Area Development Guide, Where existing buildings do not comply with the Master Plan and Area Design Guide, the buildings shall not conform to adjacent buildings... 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 JBLM’s Installation 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 JBLM’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:

6.5.2.3.1 GENERAL: Provide facilities that are fundamentally sustainable, require minimum operation and maintenance inputs, reflect the military hierarchy of their occupants and blend harmoniously in style and context throughout the East Division district of Joint Base Lewis-McChord. Facilities shall conform to the Joint Base Lewis-McChord Real Property Master Plan (RPMP). Architectural theme and requirements of the East Division ADG are included in this section as well as in the East Division Conceptual Aesthetic Considerations Appendix.

6.5.2.3.2 ARCHITECTURAL STYLE: All East Division district facilities shall be based on a consistent campus aesthetic, with underlying principles of proportion based on “Neo-Georgian” or “Neo-Federal” architecture referenced from the original Garrison facilities located on Lewis Main while also incorporating regional aesthetics of the current northwest style.

Stylistic features:

- Building proportioning and massing using the “golden section”

- Building shall be divided into bays not exceeding 50’ in width and articulated using plane changes (+/- 6” min.), material changes (i.e., mass & void using brick and glazing), and window rhythm

- Balanced, syncopated rhythm of fenestration and building elements (as illustrated in the corresponding Conceptual Aesthetic Considerations Appendix)

- Elevated main entry and vestibule entrances with exterior covered areas

- Campus-like setting with buildings clustered and preservation of the maximum amount of trees on the forested site

- Structured, hierarchical building layout with primary façade/main entry facing the street

- Building axes primarily east-west where feasible

- Garden style design for barracks

Roof:

- Hip roof form with 5 foot overhangs
- Primary roof slope: 3 on 12
- Roofs slope may only be reduced where specifically noted in other sections of the solicitation. Roof slopes less than 1 on 12 are permitted only on canopies/awnings over outdoor covered space and otherwise shall be vegetated (green) roofs
- Use solar tubes, dormers, or ridge lights, as aesthetically appropriate, for day-lighting/natural ventilation where building width is greater than 50’

Fenestration:

- Maximize natural light and cross / stack ventilation, especially to occupied areas
- Provide operable windows in all occupied spaces
- Utilize large areas of curtainwall/glazing with spandrel elements at main entries and transom windows and sidelites around doors to occupied spaces
- Provide ribbon windows that extend to underside of soffit at roof line and emphasize the horizontal axis
- Wrap glazing at corners
- Windows shall be split into a day-lighting portion and a view portion, with permanent interior and exterior architectural elements demonstrated to prevent summer sun penetration to 90% of interior spaces, while allowing daylight and views
- Exterior sunshades shall not require periodic maintenance to retain appearance or effectiveness
- Blank lengths of wall exceeding 15 linear feet are prohibited on all Required Build-to Lines (RBLs) per the Real Property Master Plan
- Maximize glazing; corresponding Conceptual Aesthetic Considerations Appendix illustrates minimum amount of glazing acceptable by building type
- Window layouts and sizing shown on the standard design floor plans in other sections of this RFP are notional only. Contractor shall determine the type, size, proportion and placement of windows based on ADG requirements herein and the overall massing and layout of their particular design solution

Materials:

- Masonry elements to anchor the buildings to the site
- Complementary base and accent materials shall be stone, concrete or masonry

- Wall surfaces shall be brick masonry with ribbon / curtainwall windows and complementary flat/smooth metal panel accents

- Standing seam metal roofing

- The color scheme is primarily natural rusticated brick masonry in appearance and warm deep orangey-reds in color (as described in the exterior finishes outline found in the corresponding Conceptual Aesthetic Considerations Appendix)

6.5.2.3.3 COMPATIBILITY: Proposed facilities shall include architectural elements required by this Area Design Guide and use the color palettes as described in the East Division Conceptual Aesthetic Considerations Appendix. All facilities shall incorporate a unifying style and aesthetic for the East Division district. Lawnmower Storage Buildings (LSB) utilize the same style and materials as the facilities each LSB serves.

6.5.2.3.4 CONTEXT: See the East Division Building Photos Appendix for an outline of exterior finishes and images of existing and/or future facilities in the East Division district, in addition to illustrations that define required elements of the Area Design Guide.

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. 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) Provide permanent fall protection anchors on all roofs in accordance with OSHA requirements for personal fall arrest systems. Provide access to low slope roof areas from the interior of the building, using permanent ladders, stairs, hatches and doors. Access to roofs shall be from mechanical rooms or secured by locking mechanisms on both the interior and exterior sides to prevent unauthorized access.

(b) Minimum roof slope for low slope roof systems is ¼ inch per foot and 4 inches per foot for steep slope roof systems. (5:12 preferred) Low Slope roof systems may only be used where required in other sections of the RFP. Avoid valleys and complex flashing and complex venting conditions.. Provide roofing installation and gutter design at valleys to prevent water overflowing or overshooting the gutter. Ensure that roof coverings do not restrict water flow at end of valley, and provide baffles, conductor heads and similar elements as needed. Where downspouts from higher roof areas drain onto lower roof areas, provide elbows and extensions to direct outflow away from wall and base flashing. Protect all exterior personnel doors from the weather. Minimum thickness of roofing materials shall be in accordance with standards listed in Paragraph 4, Applicable Criteria.

(c) Exterior Wall Mockups: Construct a 6 feet wide x6 feet high, full-size representation of the typical physical exterior wall assemblies, including trim and a sample of roofing material in the mock-up wall, that are constructed on-site. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and qualities of actual materials and execution, and to review construction, coordination, testing, or operation; they are not samples. Approved mockups establish the standard by which the Work will be judged prior to selection of the final colors. Build mockup to verify selections made under sample submittals and to demonstrate aesthetic effects.

(d) Exterior Insulation and Finish Systems (EIFS), are not acceptable.

(e) Exposed exterior materials shall not require periodic repainting or refinishing. Materials shall have factory prefinished, integrally colored, or similarly intrinsic weathering finishes. Ferrous metals shall not be exposed to the weather unless prefinished with a protective coating that has a minimum 20-year

warranty. Exterior metal siding panels or metal roofing shall not exhibit oil canning. Exterior masonry surfaces shall be provided with a penetrating, breathable masonry sealer.

(f) Exterior Doors: Entry doors into lobbies and corridors shall be glazed aluminum storefront entry systems. Protect all exterior personnel doors from the weather by recessing, roof overhangs, or canopies.

(g) Exterior Windows: Provide operable windows with insect screens for all occupied spaces, unless prohibited by security standards or other sections of the Solicitation. Provide power operators only for windows that are not within the normal reach range of personnel. Provide windows in sleeping room with manufacturer's standard hardware to allow window to be opened for venting while preventing access through the opening from the outside.

(h) Aesthetically integrate the design of alternative energy systems: Solar panels, photo-voltaic panels, wind turbines, and other elements designed to increase energy efficiency into the facility appearance so that they do not appear out of character with the building or as elements added after construction. For example, roof slopes shall align with panel orientation. Show equipment types, sizes, and locations on interim design submittal drawings.

(i) Provide an antenna mount on the roof of all administrative buildings (Company Operations Facilities, Battalion Headquarters and Brigade Headquarters), to include a sleeve for antenna mounting and eyebolts for guy wires secured to the building structure, and a pathway for cable. Coordinate location with Contracting Officer.

(j) Comply with provision applicable standards and with provision of the provisions of ASME 17.1 and with Washington Administrative Code (WAC) 296-96 Elevator Safety Regulations, including inspections and certifications. Coordinate with the Contracting Officer to ensure proper attendance by Elevator Inspector during construction, inspection, and testing periods. Verify all critical construction activities that must be witnessed by the inspector and do not proceed with that portion of the work until the inspector is present. Provide a sump pump for elevators provided with Firefighter's Emergency Operation. The sump pump shall have a capacity to remove a minimum of 3,000 gal/hr per elevator and shall route directly through an oil/water separator to sanitary or storm water sewer in accordance with discharge permits, regulations, and statutes.

No additional design requirements.

6.5.3. Programmable Electronic Key Card Access Systems:

All locking systems shall comply with keyless entry standards. Only communication rooms, mechanical rooms, and electrical rooms shall have a keying lock system with interchangeable cores. Pushbutton actuators for ADA-accessible entrances shall have a keyed on/off switch on the interior side; the Coordinate the location with the Contracting Officer.

6.5.3.1. Key Changing: All locks shall be changeable without disassembly of lock cylinders; acceptable methods include interchangeable removable core cylinders.

6.5.3.2. Control of Lock Cores and Keying: Provide all hardware and construction (temporary) cores required to secure buildings, utility access, and related work throughout the construction period. Provide construction cores with a bright color on their exposed face for ease of identification. During construction, the Contractor shall meet with representatives of the Contracting Officer, PW Lock Shop, and the user to develop a keying schedule. Submit Schedule to Contracting Officer for approval. Provide final keying and combinations as performed by a licensed, bonded locksmith approved by the Contracting Officer. Upon acceptance of the facility for occupancy, replace construction cores with final cores in the presence of the government inspector and a PW locksmith, test each lock for proper operation and deliver any permanent or control keys to the inspector. Prior to core change out, provide the government, by security shipment, with keys tagged with identifying labels in the quantities indicated.

6.5.3.3. Authorized Locksmiths: The following locksmiths are currently approved by the JBLM PW Lock Shop to combinate cores for locksets used in this project. Verify that authorization remains current prior to beginning lock/core related work on this project.

(a) Bassett Services: POC: Bob Bassett, 2111 Hernlock Ct SE, Lacey, WA 98503 (360) 239-4416

(b) PD Services Unlimited: POC: Pam Johnson, 9508 356th St. S., McKenna, WA 98558 (360) 359-0811

(c) Security Unlimited: POC: Mike Pennella, 8205 E. Martin Way #188, Olympia, WA 98516 (360) 351-951-1774 (cell)

6.5.3.4. Cylinders and Cores: Provide cylinders and cores with six-pin tumblers for locks. Cylinders shall be products of one manufacturer, and cores shall be products of one manufacturer. Rim cylinders, mortise cylinders, and knobs of bored locksets shall have interchangeable cores that are compatible with A-2 standard (A-2 system specifications are available at http://www.lab-lockpins.com/pinsicore.htm) and that are removable by special control keys. Stamp each interchangeable core with a key control symbol in a concealed place on the core. Cylinders shall be fully compatible with products of the Best Lock Corporation, Arrow Lock Corporation, or Falcon Lock. Submit a core code sheet with the cores. Provide cores master keyed in one system for this project. Provide construction interchangeable cores.

6.5.3.5. Keys: Furnish four keys for each lock core KD (keyed different), and four keys for each set KA (keyed alike) to the PW Lock Shop for control and issuing. In addition to the keys listed above, furnish four additional key blanks per core KA. Stamp each key with appropriate key control symbol and “U.S. Property – Do No Duplicate”. Key bows must be stamped with key code line ID (example: LA1223, MPA1223, etc.). All JBLM codes are one to four letters and one to four numbers. Public Works Lock Shop will provide ID information and Master control number to be used in combinating cores. Do not place room number on keys.

6.5.3.6. Programmable Pushbutton Locksets: Hardware shall be programmable pushbutton locksets OSI Omnilock “OM500” for all exterior entrance doors, including glazed doors in aluminum store front systems, and KABA “E-plex 5000” for all locking interior doors, except provide standard bored locksets on mechanical, electrical, and telephone rooms. For programmable locks, provide key override and interchangeable cores.

6.5.3.7. Mechanical, Electrical, and Communication Room Doors: Provide standard keyed locksets for these doors. Key mechanical/electrical equipment rooms and rooms dedicated to fire protection equipment for a JBLM master key #750.

6.5.3.8. High Security Doors: Provide doors for vaults, secure document storage rooms, SIPRnet communications rooms, and similar spaces requiring a high level of physical security with locks complying with the requirements contained in the security standards referenced for spaces designated under Functional Area Requirements in paragraph 3. These may include combination locks and other special hardware.

6.5.3.9. FIPS identification card capable proximity card readers: Hard-wire proximity card readers to a central control system, FIPS-capable, and shall be Millennium Entry access control system, manufactured by Millennium Group. Provide these where required elsewhere in the solicitation.

6.5.4. INTERIOR DESIGN

6.5.4.1. Special Signage: The following special signage is required.

(a) Fire Department Connection: Mount sign on the building above exterior fire department connection. Sign shall be a minimum of 20 by 15 inches, mounted 8 feet above grade, with red text on white background.

(b) Gas Shutoff: Mount sign on the building above the natural gas meter and valve. Sign shall be a minimum of 20 by 15 inches, mounted 8 feet above grade, with red text on white background.

(c) Alarm System: Mount sign centered on all doors accessing rooms and spaces protected by alarm systems. Text at top of sign shall be as specified in AR 190-11, Appendix F. Bottom of sign shall have message in Braille.

(d) Backflow Preventer Test Valve: Mount sign on the building above the backflow preventer test valve. Sign shall be a minimum of 20 by 15 inches, mounted 8 feet above grade, with red text on white background.

(e) Fire Pump Test Valve: Mount the sign on the building above the fire pump test valve. Sign shall be a minimum of 20 by 15 inches, mounted 8 feet above grade, with red text on white background.

(f) Fire Alarm Panel Equipment Room: Mount the sign on the door accessing room with text “Fire Alarm”, minimum 16 by 2 inch letters, red text on white background.

(g) Fire Suppression Sprinkler Riser Room: Mount the sign on door accessing room with text “Sprinkler Riser”, 16 by 2 inch letters, red text on white background.

(h) Post conspicuous sign(s), directing the fire department to all fire protection equipment. If fire department connection and/or PIV are located away from facility, stencil/label the building number with reflective 2-inch numbers and paint the valves shall be painted red

6.5.4.2. Handrails: All handrails shall be metal. Wood handrails are not permitted.

6.5.4.3. Floor in entry and circulation areas: Use porcelain tile or resilient tile flooring in high traffic (main circulation) areas of administrative facilities. The use of carpet in high traffic circulation areas is only be permitted at second floor areas where needed for acoustical purposes.

6.5.4.4. Casework: Use plywood substrates for casework.

6.5.4.5. Cook-top surfaces in Barracks: Do not use glass top range surfaces.

6.5.4.6. Fire Extinguishers in Barracks: Do not provide fire extinguisher brackets or cabinets in Barracks with automatic fire suppression systems, except provide cabinets in common cooking areas.

6.5.4.7. Wall and ceiling finish: Gypsum wallboard surfaces shall receive a Level 4 finish, drywall primer and light orange peel or similar finish texture to conceal imperfections; except exposed surfaces in wet locations, which shall receive a Level 5 finish, with drywall primer. Exposed concrete surfaces shall receive a Level 1 finish. Finish in accordance with standards listed in Applicable Criteria.

6.6. STRUCTURAL DESIGN

6.6.1. Design the facility assuming a ground snow load of 15 psf, Terrain Category C. However, design all roof structures for a minimum uniform roof snow load of 25 psf. An additional 5 psf rain-on-snow surcharge load shall be applicable in accordance with the requirements of ASCE 7.

6.6.2. Design the facility using a basic wind speed of 85 mph.

6.6.3. Design the facility using a Spectral Response Accelerations (SRA) for 0.2 seconds, Ss=1.202. SRA for 1.0 second, S1=0.380.

6.6.4. Extend bearing portions of substructure to levels below frostline, not less than 18 inches below grade.

6.6.5. The structural system shall be compatible with building use. For example, do not locate columns in rooms requiring visibility or open space, such as entries, common areas, etc.

6.6.6. Refer to Appendix for additional hardening requirements when required.

6.7. THERMAL PERFORMANCE: No additional requirements. Enhanced thermal envelope may be used to improve energy performance in pursuit of lower energy usage and LEED point(s).and compliance with the guiding principles for high performance and sustainable buildings.

6.8. PLUMBING

6.8.1. PLUMBING FIXTURES: Plumbing fixtures shall include the following.

6.8.1.1. General: Where it is possible and economically feasible to use reclaimed water for such applications as irrigation, clearly label and mark all piping, fittings, equipment, and devices associated with such a system with the color purple.

6.8.1.2. Mop Sink: Provide floor-mount type.

6.8.1.3. CONTROLS: The DDC system shall have the capability of controlling domestic hot water circulation pumps and the temperature of domestic hot water.

6.8.1.4. Motion-activated plumbing fixture valves shall be hard-wired (not battery operated).

6.9. SITE ELECTRICAL AND TELECOMMUNICATIONS SYSTEMS

6.9.1. Site Power

6.9.1.1. General: Electrical power distribution is a 13,800-volt, 3-phase, 3-wire single-point grounded wye system. JBLM has adopted Tacoma Public Utilities (TPU) utility design criteria and construction standards for all power distribution work performed on the Installation. Design and construct in accordance with TPU standards, except for requirements associated with single-point grounding. The “single-point grounding” portion of the JBLM distribution system applies to a single reference point to ground at the substations only. JBLM is, for all intents and purposes, a Delta System, so the neutral conductor shown on the TPU details should be disregarded. Refer to TacomaPower.com for construction details and specifications and to JBLM Exterior Electric Shop at (253)-967-5840 for any questions regarding system requirements. Comply with the most current National Electrical Safety Code (NESC ANSI C-2), NFPA 70 and TPU standards for the Work of this Contract. JBLM standard details are available on http://designstandards.lewis.army.mil/index1.htm

(a) Design, furnish, and install a 15kV class distribution system that extends from the existing system, provides power for the facilities in this project, and provides expansion capability for future projects. Coordinate the distribution system expansion with the Public Works Electrical System Manager Engineer and the Exterior Electric Shop.

(b) Demolition: Turn over any existing distribution equipment required to be removed under this contract to the Public Works Exterior Electric Shop. Coordinate turnover with the Exterior Electric Shop Foreman.

(c) Seismic Bracing: Brace or anchor distribution equipment to resist horizontal forces acting in any direction per the site class and seismic use group as defined in the International Building Code and ASCE 7..

(d) System Coordination Study: Provide a coordination study to demonstrate that the equipment selected and system constructed meets the contract requirements for equipment ratings, coordination, and protection. Perform an arc flash study to determine the required personal protection equipment (PPE). Mark panelboards and other electrical equipment that require work when energized with PPE requirements per NFPA 70E Section 130.3(C). A registered professional engineer with demonstrated experience in power system coordination shall perform the study. Start coordination study at the first

device located upstream of the equipment to be installed. Coordinate with JBLM PW Exterior Electrical Shop for upstream device information and for system fault currents.

6.9.1.2. Primary Duct Banks: Medium-voltage ducts shall be minimum 4-inch Schedule 40 PVC encased in controlled density fill (CDF) except under roads or paved areas subject to vehicular traffic, Provide Schedule 40 PVC in duct banks under roads or paved areas subject to vehicular traffic, encased in 3000 psi reinforced concrete. A 36-inch minimum burial depth is required to the top of the concrete encasement. Provide a 6-inch wide metallic warning tape above primary duct banks at 12 inches below finished grade. Arrange ducts so that they enter manholes and vaults at the lowest point. Provide at least one spare duct in all medium-voltage duct banks and a pull cord in all empty ducts. Provide bare copper ground conductor in the duct bank encasement and ground the conductor in all vaults. Minimum size is #2 for lateral feeder, #2/0 for lateral main feeder and #4/0 for main feeder.

6.9.1.3. Medium-Voltage Conductors: All medium-voltage conductors shall be 15kV, EPR, CU, 133 percent insulation, with insulation shielding. Main feeders shall be 500kcmil in 5 inch PVC duct with 600-ampere terminations; loop lateral main feeders shall be #4/0 AWG in 4 inch PVC duct with 200-ampere terminations; and lateral feeders to transformers shall be #2 AWG in 4” PVC duct.

(a) Splicing: Where splicing is required, provide 4-way in-vault junction assemblies in an appropriately sized vault, minimum size 7 feet x 7 feet x 6 feet deep, with a double hinged diamond-plate lid. Angle assemblies upward at a 45-degree angle to facilitate above-ground operation. All 200-ampere medium-voltage separable insulated connectors shall be of the load-break type. In-line and T-tap primary splices are not permitted. Provide test points on elbows at junction assemblies, pad-mount transformers and switches.

(b) Fire Taping: Provide fire protective tape on all medium-voltage conductors in manholes and in vaults under transformers, switches, and in-vault junction assemblies.

(c) Labeling: Label all cables by means of fiber, laminated plastic, or nonferrous metal tags indicating the cable type, conductor size, circuit number, circuit voltage, cable destination, and phase identification. coordinate labeling requirements with PW.

(d) Testing: Provide hi-pot and phase testing on all new primary conductors prior to energizing the cables.

6.9.1.4. Manholes and Vaults: Size manholes a minimum of 7 feet x 7 feet x 6 feet deep and comply with minimum cable bending radius requirements according to the current edition of the National Electrical Safety Code (NESC), except manholes with in-vault junctions shall be 7-feet by 7-feet by 6-feet deep. Install manholes at street intersections to facilitate street crossings, and space manholes a maximum of 500 linear feet apart or less as required to minimize pulling tension on the conductors. Provide vaults under all transformers and distribution switches with external man access hatch and with the pad-mount serving as a portion of the lid for the vault. Provide a minimum 6-inch diameter knockout at the bottom of the vault for drainage.

(a) Conductor Installation: Secure conductors to insulators on racks on all four walls of vaults, with secondary conductors mounted at least 8 inches above medium-voltage conductors, looped and racked a minimum of 360 degrees, and arranged in an approved manner that provides safe and rapid access to personnel during installation and maintenance. Conductors shall enter and exit the vault in such a way as to maintain the same direction of rotation, either clockwise or counterclockwise as appropriate.

(b) Vault Penetrations: Properly seal all transformer vault penetrations with waterproof grout to prevent water and moisture from entering the vault. Install ducts installed with the bell end flush with the vault’s inside wall surface.

(c) Conduits: Install conduits with secondary conductors above conduits with medium-voltage main feeders.

(d) Testing: Provide DC hi-potential, shield continuity and phase rotation testing on all new primary conductors prior to energizing the cables.

6.9.1.5. Junction Pedestals: Provide junctions above ground or in manholes. Where four-way junctions are installed in manholes, provide manhole with diamond plate, two-section steel covers and set junctions upwards at a 45-degree angle to allow for hook-stick operation from above the manhole. Include insulated-bushing type parking stands adjacent to each separable loadbreak elbow to provide for cable isolation. Above-ground junction pedestals are required where the number of junctions exceeds four.

6.9.1.6. Distribution Switches: Primary distribution switches shall be fused, dead-front, bio-preferred liquid-filled, above-ground, vacuum type. All switch taps shall be switchable and 200A taps shall be fused. Install switches above ground on concrete vaults with external man access door and with the switch pad serving as a portion of the lid for the vault.

6.9.1.7. Padmount Distribution Transformers: Furnish and install liquid-filled. pad-mounted transformers for the facility in the project. Locate transformers to comply with AT/FP requirements. Based on the electrical load of the facility or facilities to be served, determine the KVA capacity and low-voltage rating of the transformer. Install outdoor, medium-voltage transformers on vaults.

(a) Transformer Specifications: Distribution transformers shall be new, loop-feed, with two separate windings per phase and shall be of the less-flammable, liquid-insulated type with bio-based biodegradable dielectric liquid derived from natural esters, complying with IEEE C57.12.00 and IEEE C57.12.21. Use high fire point fluids for indoor/vaults. Transformers shall be dead-front, equipped with oil-immersed bayonet-type overload fuses in series with partial range current-limiting fuses, five primary taps (two-above and two-below nominal), and three two-position load-break switches to permit opening and closing of either side of the loop, and the ability to de-energize the transformer with the loop remaining energized. Permanently attach high-voltage warning signs to each side of the transformer and include transformer KVA rating, secondary voltage and phase information at the front door of the secondary compartment. Provide copper-faced or stainless steel ground connection pads in the high- and low-voltage compartments, a dial-type thermometer, pressure-relief valve, liquid-level gauge, and drain valve. Provide oil sampling tube on transformers 500kVA and above. Provide removable MOV surge arrestors on the unused side of loop transformers, where applicable, with removable grounds. Where the transformer is used as a feed-through, provide fault indicators . Provide insulated bushing-type parking stands adjacent to each separable load-break elbow to provide for cable isolation. Provide padlock hasps and locks Coordinate lock style and material with the PW Exterior Electrical Shop. Provide bollards for protection in locations vulnerable to vehicular traffic per TPU standards.

(b) Primary Connections: Primary underground-to-overhead conductor connections shall be Burndy WEJTAP, Tyco AMPACT Wedge, or approved equal. Provide mechanical connectors at arrestor grounds.

(c) Distribution Cutouts: Where the existing overhead primary is tapped for service to a padmount transformer, the distribution fused cut-outs shall be of the load-break, silicone type that meets the following criteria: Open outdoor load-break fused cut-out with Type K fuses conforming to NEMA C37.42 with rated amperes to match system requirements. Install silicone rubber insulators, clamshell terminal connectors, NEMA B bracket, 12 kAIC symmetrical fault-interrupting current rating, with solid cap fuse holder.

(d) Secondary Connections: Secondary conductor connections shall be compression type. Provide antioxidant compound where required by code. No penetrations are allowed through the transformer casing.

(e) Transformer Grounding: Provide a buried copper ground ring consisting of four ¾-inch x10-foot ground rods around each transformer pad and ground per NESC for a single-point grounded wye distribution system, with secondary neutral ground isolated from equipment ground and the ground strap removed. Neutral ground shall be 600V insulated copper wire at least 20 feet away from the transformer grounding ring and at least 90 degrees apart from the primary duct bank. Below-grade ground connections shall be of the exothermic type. Refer to JBLM PW for typical detail.

(f) Transformer Pad: Transformers shall sit on a concrete pad sized to serve as a portion of the lid for the vault below the transformer. Pads for all transformers include an external man access into the vault without removing the transformer. Access into the vault shall be through a double-hinged diamond

plate lid. Vault for small transformers serving roadway utility loads, such as street lighting and traffic signals, may be 5 feet x 7 feet x 5 feet with padmount that includes external man access. All pads shall extend 6 inches beyond the transformer enclosure.

6.9.1.8. 600-volt Distribution: Provide a 600V underground distribution system from the secondary side of all transformers installed for service to buildings within the scope of this project. Cables shall be copper with 90 degree C insulation and suitable for use in an underground duct system. All secondary duct banks shall be direct-buried Schedule 40 PVC with a minimum of 3 inches of sand above and below ducts, except under roads or paved areas subject to vehicular traffic, and shall contain at least one spare duct. Provide Schedule 40 PVC in duct banks under roads or paved areas subject to vehicular traffic, encased in 3000 psi reinforced concrete. Minimum burial depth shall be 30-inches below finished grade. Provide a 6-inch metallic warning tape above secondary ducts at 12-inches below finished grade. Determine the secondary conductor size, duct size and quantity based on the transformer rating and building service requirements, adjusted for voltage drop. Secondary conductors shall not be larger than 500kcmil Provide galvanized rigid steel (GRS) conduit long-radius elbows and transitions from below to above grade and into buildings, and wrap all GRS conduits below grade to prevent corrosion. Provide compression type-connectors at the transformer secondary and the building service entrance switchboard.

6.9.2. Site Telecommunications

6.9.2.1. General: Government Telecommunications systems (voice/data) consist of the Army-owned telephone system, which provides Army communications, and the Local Area Network (LAN), Qwest Communications for residential and non-Army telephones, and COMCAST cable television. Furnish and install outside plant telecommunications manholes, ducts/conduits, and required distribution cables between identified point of connection and the building's telecommunications entrance facility Coordinate all communications requirements with the JBLM NEC, , specifically with the Plans Branch and the MCA Info Tech Project Manager Specialist and Team Members, through the Contracting Officer. Coordinate and attend inspections by NEC during each phase of construction.

(a) Coordination with Adjacent Construction Projects: Alert the Contracting Officer if coordination with adjacent construction projects is required by the Communications System Contractor.

6.9.2.2. Telecommunications Manholes:

(a) Telecommunications manholes shall meet existing infrastructure or approved equal, sized and oriented correctly, and shall be installed IAW manufacturer's instructions. Telecommunications manholes shall meet the following minimum criteria:

1. Concrete shall have a minimum compressive strength of 7000 psi at 28 days.

2. Design manholes/vaults to meet an AASHTO H-20 loading.

3. Manholes/vaults shall have galvanized embedded pulling irons in each corner, top and bottom.

4. Manholes/vaults shall have a minimum of four galvanized "C" channels per longitudinal side.

5. Equip manholes/vaults with PVC duct terminators at all points of entry/terminations (Term-a-duct or similar).

(b) Plug all ducts, sub-ducts, and innerducts, whether main or subsidiary runs, using universal screw type duct plugs in telecommunications manholes and hand holes and at building entrances. Foam sealant is not acceptable.

(c) Splice cases shall be of the pre-formed stainless steel type for copper and Tyco or approved equal for fiber splice cases. "Stretch cases" are not allowed. Do not use encapsulating compounds. Flash test using dry nitrogen gas to ensure dry and airtight seals.

(d) Provide Notify NEC at least 48 hours prior to installation of telecommunications manholes and obtain approval on manhole orientation.

(e) Provide grounding and bonding in telecommunications manholes to comply with I3A/TIA/EIA.

(f) Provide labeling per JBLM NEC Standards.

6.9.2.3. Telecommunications Duct Banks. In addition to the requirements of I3A, encase duct banks in concrete in the Cantonment Area of JBLM.

6.9.3. Site Lighting

6.9.3.1. General: Provide exterior lighting appropriate for the building and parking lot functions and to comply with LEED and 10 CFR Part 436 – Federal Procurement of Energy Efficient Products. LED-type function. Provide street lighting (with photoelectric control) on metal poles with grounding system for any new streets and on streets that are modified as part of this project. To the extent possible, street lighting style shall match the type used on the existing streets within the project area, but must be LED type..

(a) Provide exterior induction type parking lot and pedestrian pathway lighting conforming to the applicable criteria Illuminating Engineering Society of North America (IESNA) recommended illumination levels and the state Non-Residential Energy Code. Provide metal poles with pole-mounted, color-corrected, induction or LED luminaires with cut-off feature to minimize light pollution per LEED. Site lighting circuits shall be direct-buried Schedule 40 PVC conduits encased in sand, except where subject to vehicular traffic; those locations shall use Schedule 40 PVC conduits encased in 3000 psi concrete, extended a minimum of 6 feet beyond the roadway or parking area. Provide 24-inch minimum burial depth and 6-inch wide warning tape at 12 inch minimum below finished grade and hand holes. Provide handholes at each lighting pole. Provide site lighting circuits and controls from the adjacent primary facility service. The photoelectric control shall have a manual bypass. Locate control panels in electrical rooms for access by PW. At Lawnmower Storage Buildings and similar locations, provide controls in a lockable NEMA 3R enclosure mounted at the exterior of the building.

(b) Security lighting for boundaries and controlled areas, when applicable, shall meet minimum illumination as indicated in the Security Engineering Technical Manual (SETM) 853, Volume 2.

6.9.4. Site Grounding

6.9.4.1. General: Soil resistivity at JBLM is extremely high, requiring additional measures to be taken in the grounding system design. Submit design drawings and calculations based on soil resistivity data and include measures such as counterpoise systems, buried plates, chemical grounds, and bentonite backfill to achieve the 10-ohm maximum resistance required by I3A for earth electrode subsystems. At a minimum, site grounding shall consist of a counterpoise grid system composed of 3/4-inch x 10-foot minimum copper clad steel ground rods interconnected by stranded bare #1/0 copper wire. Make connections using exothermic welds below grade for connections to electrical panels, communications system grounds, building steel and static ground points. Exposed ground connections shall be removable pressure type. Grounding and bonding shall comply with Article 250, NFPA 70.

6.10. FACILITY ELECTRICAL AND TELECOMMUNICATIONS SYSTEMS

6.10.1. Power

6.10.1.1. General: Provide at least one exterior door on the ground floor to the main electrical room, sized as appropriate for equipment removal or maintenance..

6.10.1.2. Service Equipment: Provide a service entrance switchboard or main distribution panel in the main electrical room with copper bus, transient voltage surge suppression, fully rated and selectively coordinated with downstream circuit breakers. (Series-rated breakers are not acceptable.)

(a) Provide a meter in the service switchboard that is compatible with the posts post's Java Application Control Engine (JACE)/DDC system. The meter shall measure kilowatt-hour demand averaged over a 15-minute interval, phase voltage, amps, frequency, true power, reactive power,

apparent power, and power factor with an accuracy of 1.0 percent minimum. The meter shall include battery backup, on-board data storage for a minimum of 30 days, peak demand recording, time-of-use logging, and remote alarm annunciation for power outage, phase loss, and phase voltage over/under conditions. Provide communications conduit and wiring from the meter to the DDC system in the mechanical room with ANSI/CEA-709.1b protocol (LonWorks) output for communications using standard network variable types (SNVTs) for measured values.

(b) Provide panelboards with copper bus and bolt-on circuit breakers, fully rated and coordinated between downstream and upstream circuit breakers. Locate panelboards and dry-type transformers in electrical rooms only with appropriate ventilation for heat dissipation.

(c) Provide a lighting inverter system that meets the requirements of NFPA 101 for power to exit signs and egress lighting. Inverter shall include battery-operated computer-based self-test/self-diagnostic feature that automatically performs a minimum 30-second test and diagnostic routine at least once every 30 days and indicates failures and alarms. Automatic testing shall also include a yearly test for a minimum of 90 minutes, with failures and alarms indicated. Pass/fail status, test history, and alarm information shall be stored in memory and retrievable from unit display, with provisions for remote alarm indication and condition monitoring. Battery systems shall incorporate maintenance-free lead-acid or lead-calcium batteries. Locate the emergency power source in a dedicated electrical equipment room, readily accessible to maintenance personnel from the exterior of the facility, independent of building occupants.

6.10.2. Telecommunications

6.10.2.1. General:

(a) Horizontal cabling will not exceed 295 feet from telecommunication room to outlet location per I3A Criteria and EIA/TIA standards.

(b) Coordinate with the NEC Plans Branch during the design development process, preferably using mutually agreeable Over the Shoulder Review processes, as discussed in Section 01 33 16, Design After Award..

(c) Provide a cable pull-through in the main NEC telecommunications room to a dedicated room with space on the telephone back board for commercial telephone and cable TV service providers. Qwest and Comcast will furnish and install their entrance cables and make connections to their equipment under separate contract with the Government. Coordinate with these providers and allow them access to perform their work.

(d) The Contractor shall furnish and install interior cables from cable television outlets and from commercial telephone outlets that may be required for the facilities in this project back to the appropriate demarcation point.

(e) Comcast and Qwest will make the connections to their equipment under separate contract with the Government.

(f) Do not use J-hooks.

6.10.2.2. Provide a standard I3A/TIA/EIA information outlet on the telephone backboard for connection to the Base EMCS and coordinate the outlet location with JBLM PW.

6.10.2.3. Coordinate the following with NEC:

(a) Telecommunications room equipment layout, grounding and bonding requirements, cable runways, labeling requirements, dedicated and convenience power outlets, backboards, concrete floor anti-static sealant, and air conditioning requirements. Provide backboards on at least three walls in telephone rooms.

(b) Confirm standard administrative outlet configuration and labeling requirements (three CAT 6 cables to provide two data and one voice).

6.10.2.4. Cable test reports. Include the model/serial number of the test equipment, calibration certificate, and name of technician. Hand generated reports are not acceptable.

6.10.2.5. Provide CAT 6 cables that are UL-listed for wet environments where cables are routed in conduits installed inside or below slab-on-grade concrete floors.

6.10.2.6. Where protective distribution systems are required, provide systems by Holocom, Inc. or approved equal. Cable colors shall be blue for data, white for voice, red for SIPRNet, and yellow for JWICS.

6.10.2.7. Seismic Bracing: Brace or anchor equipment to resist horizontal forces acting in any direction per the site class and seismic use group as defined in the IBC.

6.10.2.8. Field Radio Antenna: Coordinate with contracting officer to determine if a field radio antenna is required by the building occupant. If required, provide a 2-inch raceway from the Duty Office (or location designated by the User) to the exterior of the building with a grounding bushing at the interior and a weather head at the exterior and coax cable for a field radio antenna connection. Coordinate installation requirements with the User.

6.10.3. INTRUSION DETECTION

6.10.3.1. General: For applicable facilities per paragraph 3, design and install a complete, fully tested intrusion detection system (IDS), including installation of Government-Furnished Contractor-Installed (GFCI) equipment, all conduits and conductors, drawings, system integration, and all testing.

6.10.3.2. The IDS is an Integrated Commercial Intrusion Detection System II (SAFENET ICIDS II) manufactured by MDI, Inc., 9725 Datapoint Drive, San Antonio, Texas 78229. IDS equipment and devices (RTU's, PPU, BMS, PIR, etc) shall be GFCI devices. Upon receipt of equipment, the contractor shall be responsible for all labor and installation warranty issues associated with installation. Coordinate system requirements with the Directorate of Emergency Services (DES) Physical Security.

6.10.3.3. The IDS shall use Version 6.2.1.6 SAFENET or the latest software or firmware for operating environment, with PB2000 processor, firmware revision 1.51, encrypted, and carried over the installation security VLAN. Upon award and at the time of LAN connection, request from DES Physical Security the correct VLAN to be assigned. System shall be fully compatible with the existing ICIDS II security system. Battery backup shall be provided for a minimum of six hours for all ICIDS components, to include subcomponents that support the communication operation and reporting of alarm events. Every effort should be made to place ESS systems on a generator back-up circuit. All ESS for secret compartmented information facilities are required to be provided with 24-hour back-up and to be connected to the facility emergency generator panel.

6.10.3.4. Work includes updating input points and graphics at the central monitoring station to provide a turnkey system. Contractor shall coordinate with the Government Construction Representative and Directorate of Emergency Services/Physical Security for access to the central monitoring station.

6.10.3.5. To reduce system compatibility problems, the IDS shall be installed by MDI-certified ICIDS II integrator with a minimum of five years of experience installing, integrating, and programming on systems comparable in size to JBLM ICIDS, and with the following clearances and certifications:

- Company TOP SECRET
- SECRET for system administrators, programmers, and supervisors
- CONFIDENTIAL for all others performing work on ICIDS

Provide proof of clearances and certifications to the DES.

6.10.3.6. Security Contractor and USACE project team should coordinate and receive security system design requirements approval for all ESS from DES Physical Security in advance of any pathway or construction effort.

6.10.3.7. Forward all drawings and specifications to the USACE Electrical Division for coordination with DES Physical Security for approval. Emboss seal all drawings and submittal packages, using a unique embossed and raised stamp seal typically with the name of the security (sub)contractor. Drawings are to be limited to not more than three sets. Label copies “Do Not Duplicate, Copy 1, 2, 3 (as applicable)” ,followed by “Security Sensitive”.

6.10.3.8. Provide the contracting officer and DES Physical Security a minimum of two weeks’ notice for scheduling the Government’s performance verification test (PVT). Complete the Contractor performance test in advance of the Government PVT. Prior to scheduling the PVT, submit Contractor performance test results, substantiating that the system meets contract requirements. DES will perform 72 hours of endurance testing in advance of final acceptance. Representatives of the USACE project team, Contractor, and DES will attend the PVT.

6.11. HEATING, VENTILATING, AND AIR CONDITIONING

6.11.1. The HVAC systems for these facilities shall provide heating, ventilation, and (in some cases) cooling, with a design intended for personnel comfort and cooling of electronic equipment (computer servers, communication equipment, etc.). While select spaces may be air-conditioned as required, whole building air-conditioning is not authorized at JBLM. In addition to Telecommunications Rooms and Telecommunications Equipment Rooms, (including SIPRNET ROOMS, where applicable for specific facility type), the following rooms/areas require air-conditioning: None required**.** Do not use ozone-depleting refrigerants.

6.11.2. Locate all primary mechanical equipment such as air-handlers, boilers, hot water heaters, pumps, storage tanks, etc., inside a main mechanical room where possible. Unless specifically called for by a standard design in paragraph 3, do not install mechanical equipment on the roof. All equipment shall be of the high-efficiency type and in compliance with ASRAE 90.1.

6.11.3. DESIGN CRITERIA: All equipment and controls shall be integrated and communicate with the existing JBLM Tridium Niagara system via LonMark/LonTalk and/or BACnet communication protocols.

6.11.4. DESIGN REQUIREMENTS

6.11.4.1. Design conditions include the following.

(a) Outdoor Conditions

(Reference: ASHRAE Puget Sound Chapter “Recommended Outdoor Design Temperatures, Washington State,” 2nd Edition)

Winter Dry-Bulb (0.6 percent):	24° F
Summer Dry-Bulb:	82° F
Summer Wet-Bulb:	64° F

(b) Indoor Conditions

Winter Dry-Bulb:	68° F
Summer Dry-Bulb:	77° F (air-conditioned spaces only)

(c) Ventilate elevator equipment rooms per IBC and WAC Chapter 296-96.

6.11.4.2. Have State of Washington inspect boiler and provide certification documentation to the contracting officer’s representative.

6.11.4.3. Heat and ventilate the buildings without the use of mechanical cooling. Design system for 100 percent outdoor economizer controls to satisfy building sensible cooling load calculated at an outside air temperature of 55° F using heating and ventilation air handlers. Provide the capability to control outside air to minimum ventilation rates per ASHRAE 62.1-2006, including the use of CO2 sensors and occupancy sensors for demand control ventilation.

6.11.4.4. Telecommunications Rooms and Telecommunications Equipment Rooms, (including SIPRNET ROOMS, where applicable for specific facility type) require cooling. Electrical rooms may require cooling. Perform heat load calculations to include all anticipated heat-producing equipment located within these spaces and provide a temperature control and ventilation system based on manufacturer's recommended data as well as published criteria such as can be found in "ASHRAE Thermal Guidelines for Data Processing Environments." The design for electrical rooms shall use mechanical cooling only if heat load calculations indicate that ventilation (outdoor air) alone cannot maintain recommended room temperature. Where mechanical cooling is required, provide permanently installed units that have the capacity for both heating and cooling to increase efficiency gains and reduce the number of separate systems requiring maintenance. The type of units supplied shall conform to the following order of preference: (1) ground source heat pumps, (2) air source heat pumps, and (3) hybrid natural gas/electric units. Base the choice of system on life-cycle cost effectiveness as determined by Subpart A of 10 CFR 436. The unit can have a backup natural gas component for less than optimal conditions, if needed; the unit should be capable of operating in economizer mode to ventilate the space with outdoor air until the thermostat calls for mechanical cooling. Include exhaust systems all toilet rooms, shower rooms, janitor rooms, kitchens, clothes dryers, and electrical and mechanical rooms. Exhaust toilet rooms per ASHRAE 62.1

6.11.4.5. In the absence of published manufacturer's specifications, provide environmental conditions in accordance with one of the following.

(a) ANSI T1.304 -1997 Ambient Temperature and Humidity Requirements for Network Equipment in Controlled Environments

(b) ASHRAE Thermal Guidelines for Data Processing Environments

(c) Network Equipment Building System (NEBS)

(d) Telcordia GR-63-CORE

6.11.4.6. Cast iron boilers of any type are not allowed.

6.11.5. DIRECT DIGITAL CONTROL AND ENERGY MANAGEMENT CONTROL SYSTEM: The direct digital control (DDC) and UMCS in Paragraph 6 take precedence over the DDC and UMCS requirements in Paragraph 5 of this SOW. The UMCS uses a Tridium Niagara AX platform that is designed to provide interoperability using LonMark/LonWorks and BACnet compliant controllers.

6.11.5.1. Compatibility: Provide a building DDC system compatible with and remotely programmable and configurable through the (JACE) Network Area Controller (NAC) and the PW Tridium AX system via the existing base-wide IT wide area network (WAN) operated by NEC. The JACE Network Area Controllers (NAC) have been approved by NEC for connection to the WAN/LAN. NEC does not allow routers on their WAN/LAN system.

6.11.5.2. Integration with Base-wide DDC System. The building control system shall integrate with the Tridium system, control the indoor environment, monitor and manage fuel and energy consumption, schedule preventative maintenance, control interior and exterior lighting, monitor water usage and hot water temperatures at tank and at hot water heater, discharge outlet and after the mixing valve; and monitor electrical consumption, monitors packaged equipment controls, and equipment alarms. All motors are to be monitored for actual status using current transmitters.

6.11.5.3. Interface Standards. Provide a LonWorks or BACnet interface for packaged equipment controllers, when necessary for network communication. The DDC system shall be in strict accordance with section 23 09 23 (formerly 15910) as published on the JBLM design standards website (http://designstandards.lewis.army.mil/index.htm).

6.11.5.4. LEED Compliance: The DDC system shall have measurement and monitoring capability to provide verification of LEED "Silver" criteria

6.11.5.5. Workstation. Provide a centrally located (usually the mechanical room) workstation for each building's control system to monitor and control each zone setpoint. One DDC system workstation shall be provided for each project in at least one of the project buildings. The workstation shall include one desktop computer, monitor, etc. Performance shall meet current technology standards. Provide web supervisor workstation software, licensed to JBLM/GSA in the "Owner" section. Provide a security workstation cabinet with the following features:

(a) Locking upper compartment with Plexiglass window providing viewable access to most 20-inch monitors.

(b) Locking pull-out drawer: Facilitates ergonomic operation of keyboard, mouse, and convenient storage of small supplies; keyboard and supplies can be accessed even while top and bottom compartments are locked.

(c) Full-size locking bottom doors in front and rear for complete access to equipment and cables; lower compartment features one fixed bottom and one adjustable shelf for desktop or tower style PCs, printer, paper or supplies; louvers in rear provide equipment ventilation.

(d) Heavy-duty all welded steel top and bottom sections bolt together for easy assembly; Top Level Compartment (internal): 20-3/4" W x 21-1/4" D x 23-1/2" H; Overall Dimensions: 21" W x 22-1/2" D x 59-1/2" H.

6.11.5.6. Monitoring and Alarms. This system shall have alarms identifying when it is outside normal operation from sequence or setpoints. Provide interlock and safety routines that safeguard and prevent progressive damage to equipment due to monitored failures.

6.11.5.7. Remote Access: The system shall be user-programmable and have access from remote locations, multiple layers of secured access to data and program information, and a graphical user interface accessible through any standard web browser without manufacturer's software.

6.11.5.8. Graphical User Interface. The graphical user interface shall allow for hierarchical graphical navigation between systems and provide graphical representations of systems, access to real-time data for systems, the ability to override points in a system, and access to all supervisory monitoring and control functions. Each system display shall distinguish clearly between the following point data types and information: real-time data, user-entered data, overridden or operator-disabled points, devices in alarm (unacknowledged), and out-of-range, bad, or missing data. The software shall allow the user to create, modify, and delete displays and graphic symbols. Configure monitoring and control (M&C) software functionality. Use JBLM standard graphical pages for system graphic displays, including overrides, alarm handling, scheduling, tends for critical values needing long-term or permanent monitoring via trends, and demand limiting.

6.11.5.9. Protection of Wiring. Where wiring external to control panels is exposed to damage, the Contractor shall install all wiring, including low-voltage wiring, in metallic raceways (plenum rated wiring where not exposed to damage).Install wiring without splices between control devices and DDC panels.

6.11.5.10. Grounding. Install instrumentation grounding as necessary to prevent ground loops, noise, and surges from adversely affecting operation of the system.

6.11.5.11. Labeling and Identification. Tag cables and conductor wires at both ends, with the identifier shown on the shop drawings. Identify equipment manufacture's literature, stating compatibility with JBLM Tridium system and LonMark/LonWorks or BACnet.

6.11.5.12. Demonstration and Performance Verification Test. Demonstrate system communication by downloading programs and configuring programs to controllers over the network from the workstation. Disconnect the network server communication line from the JACEs, ensure all the JACEs continue to perform their local functions and disconnect AC power from JACEs and verify that all control functions of the DDC system continue to operate. Perform a PVT under 100% Government supervision prior to system acceptance. The PVT shall demonstrate that 100% of the system performs as specified, including but not limited to demonstrating that the system correctly performs the sequences of operation.

6.11.5.13. Utility Meter Monitoring. Where natural gas is used, provide a gas meter interface to connect to the DDC/UMCS system for monitoring gas usage. Provide electric and water meter interfaces to connect to the DDC/UMCS system for monitoring electric and water usage.

6.11.5.14. Computers. Provide one notebook computer with performance meeting current technology standards and the latest version of the Tridium AX Supervisor and AX Workbench engineering tool software, licensed to JBLM/GSA in the owner section. All computers shall have the NEC image installed through DPW IT Department before its DDC software is installed and licensed. All desktop computers, monitors, and laptop provided shall be qualified at the Silver level or higher per the Electronic Product Environmental Assessment Tool (EPEAT) (http://www.epeat.net/PublicSearch.aspx).

6.11.5.15. Room Temperature Sensors and Thermostats. Room temperature sensors shall have pushbutton occupancy override with duration adjustable in programming. Room temperature sensors shall be user adjustable with setpoint and adjustment span limited through programming at BAS/EMCS front end. Temperature sensors shall have a limited set-point and be adjustable remotely through the BAS/EMCS. Both override time frame and lever adjustment range shall be adjustable through DDC GUI. Thermostats shall not be line voltage. Room temperature sensors shall not have a digital or analog readout indicating current temperature.

6.11.5.16. Additional Software Licenses. Provide M&C software with Web Supervisor license for additional JACEs. Provide M&C software with a license for no less than the quantity of points to support systems being controlled and monitored, plus 10 percent more for expansion. The software shall be expandable in both the number of points and the number of clients supported in order to support system expansion.

6.11.5.17. Additional DDC Controller Capabilities. Provide DDC controllers that have an additional 10% unused inputs and outputs for future expansion.

6.11.5.18. Training. Provide a minimum of 16 hours of training, consisting of 8 hours of classroom and 8 hours of field training at the project site on the installed BAS/DDC/UMCS. Upon completion of this training, each student, using appropriate documentation, shall 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.

6.12. ENERGY CONSERVATION

6.12.1. 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:

None.

6.13. FIRE PROTECTION

6.13.1. FIRE ALARM AND MASS NOTIFICATION. Mass notification shall be fully functional as part of the Monaco D21 fire system. Use installation approved messages provided by JBLM Directorate of Emergency Services (DES), Physical Security Branch. The system shall also connect to the current head-end equipment (CCU) and made fully functional from the remote site located at the JBLM Emergency Operation Command facility.

6.13.2. Fire Alarm Requirements.

6.13.2.1. Install all components of the fire alarm panel, transmitter, and sprinkler system risers at a convenient location with a direct exterior access door acceptable to the authority having jurisdiction for maintenance, inspection, and testing.

6.13.2.2. Do not install components above 72-inches on walls. Maintain a 36-inch clearance around components; Maintain a 36-inch clearance around FDC and BFP intakes/discharges.

6.13.2.3. Wiring on fire alarm system components shall be Class A (Style 7) signaling line circuits (SLC), Class A notification appliance circuits (NAC) and Class A Initiating Device Circuit (IDC). Overhead, underground, or direct burial cables shall be specifically approved for the purpose. Protect fire alarm wiring that runs underground at both ends with UL listed surge suppressors.

6.13.2.4. Fire alarm systems with 4 or more devices per alarm initiating device zone shall be of the addressable type, except in troop housing where all systems shall be addressable type. Provide all fire alarm panels and associated cabinets with UL listed surge suppressors on incoming AC power.

6.13.2.5. Do not include annunciators in fire alarm system designs unless specifically called for by JBLM Fire Department.

6.13.2.6. Manual pull stations shall be double action type. Stations employing glass rods are not acceptable. Key panels and manual pull stations for a JBLM master key # 211.

6.13.2.7. Provide phenolic resin labels on all fire alarm cabinets to indicate function, as well as, in electrical supply cabinets. Labels shall be red in color with white lettering. Paper or cloth tape labels are not permitted except on wiring.

6.13.2.8. Provide training courses for the operations and maintenance staff. The system maintenance, expansion, and modification training shall consist of on-site and/or off-site class room training as necessary to fully qualify the government operations and maintenance technicians to perform all levels of maintenance, expansions, and modifications to the fire alarm system, hardware, software, and miscellaneous components. This training will include (and turn over to the government) all proprietary licenses, software, and tools to perform the required tasks. Provide all specialized equipment and/or training to program, edit existing program, add or delete devices, etc. as a part of the fire alarm system. Include and pay all costs necessary for two government personnel to attend training, to include airfare, lodging and meals, unless factory training is provided at JBLM.

6.13.2.9. Smoke detectors in addressable systems shall be photoelectric analog type, providing information that the control unit stores in memory, and uses to provide a history of detector stability, and notification at the control unit where sensitivity is outside its acceptable sensitivity range. Smoke detectors in sleeping rooms shall be fully addressable, self resetting (no manual reset required at the FACP) with a sounder base operated from the fire alarms controls panel power and having reverse polarity sounding capability for local and general alarms. Activation of the sleeping room smoke detector will only set off its sounder base for local audible alarm. A general alarm will also activate the sounder base. Upon a local alarm condition the detector shall be non-latching, not require reset at the fire alarm panel after a local alarm, and not cause the transmitter to send an alarm or trouble.

6.13.2.10. All as-built drawings shall show the exact run of conduit, quantity of wires, wire color code, location of every initiating device, signaling device, module, and any major junction boxes or power supplies. The plans will also show loop number and the address of each device or module if the system is addressable.

6.13.2.10.1. When warranty is in effect, the Contractor shall be required to respond (physically go to building in Alarm or Trouble) within 48 hours to an ALARM CONDITION and 72 hours to a TROUBLE CONDITION. Provide warranty management plan in accordance with Section Closeout Submittals..

6.13.3. For dry sprinkler systems, use only beltless and oilless compressors.

6.13.4. Coordinate with JBLM Life Safety System Manager for permit process, design, installation , and acceptance testing requirements for life safety systems

6.13.5. If a fire suppression sprinkler riser is located within a facility and is not in a mechanical room or dedicated fire protection room, the riser shall be installed in a fenced enclosure with access gate and a padlock keyed for a JBLM master key #750 to prevent access by building occupants to valves and controls. Do not locate valves and controls in stairwells.

6.13.6. Provide GE SupraSafe 2HSR or Suprasafe1 (key type: Titan Code C4733) rapid entry key boxes on exterior of building on the left side and within 6 feet of main entry and on interior adjacent to elevators.

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.

Project site is five feet or more above 100-year flood elevation.

Project site contains no habitat for threatened or endangered species.

No portion of project site lies within 100 feet of any water, wetlands or areas of special concern.

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 has an on-post recycling facility. Contact Solid Waste and Recycling Program Manager JBLM PW/ED Phone 253/966-6462 for information about materials accepted.

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

6.14.8.1. JBLM Sustainability Philosophy is to apply systematic considerations of environmental impact, energy use, natural resources, economy, and quality of life so the end result is a quality, high-performance building. Priorities in the order listed below provide guidance on the relative importance of sustainable strategies to JBLM as an aid in design decision. However, additional proven sustainable strategies are encouraged.

(a) The following are Fort Lewis' eight sustainability goals.

(1) Reduce installation stationary source and non-tactical motor vehicle air emissions 85 percent by 2025.

(2) Reduce total energy consumption by 30 percent by 2015.

(3) Sustain all activities on post using renewable energy sources and generate all electricity on post by 2025.

(4) Create sustainable neighborhoods for a livable community that enhances the Puget Sound region.

(5) Cycle all material use to achieve zero net waste by 2025.

(6) Maintain the ability of JBLM to meet its current and future military missions without compromising the integrity of natural and cultural resources, both on the installation and regionally.

(7) Recover all listed and candidate federal species in the South Puget Sound region.

(8) Treat all wastewaters to Class A reclaim standards by 2025 to conserve water resources and improve Puget Sound water quality.

(b) The following priorities support JBLM sustainability goals.

(1) Energy savings, including architectural strategies, such as building orientation, daylighting, and building envelope efficiencies.

(2) Water savings/reuse.

(3) Low-emitting, non-toxic materials.

(4) Reusable/recyclable building materials (do not use materials that must be disposed of in a landfill when removed from the building).

(5) Tie in to neighborhood sustainability features (e.g., continuance of bike lanes, neighborhood gray water treatment and reuse system, use of neighborhood heat plants).

(6) Minimize turf areas/water intensive landscapes; use xeriscaping; use low-impact development strategies for stormwater.

(7) Provide operable windows and views for all building occupants.

6.14.8.2. Energy efficiency incentives and rebates through PSE may be available to the Contractor's. Contact PSE energy management engineer to confirm the available rebates and incentive programs that is suited for the project.

6.15. ENVIRONMENTAL

6.15.1. All actions shall comply with JBLM Installation Regulation 200-1 (Environmental Protection and Enhancement) and Section 01 57 20.00 10 (Environmental Protection). Installation Regulation 200-1 is available at http://designstandards.lewis.army.mil/indext1.htm.and Section 01 57 20.00 10 (Environmental Protection).

6.15.2. Emergency Unexploded Ordnance (UXO) Response: If UXO is encountered, immediately stop all activity in the UXO area and clear the area. Immediately contact JBLM EOD professionals to conduct an emergency response. Additionally, immediately contact UXO construction support staff, if present, or call 911 or Military Police. Notify the USACE Contracting Officer's Representative (COR) of the incident, as soon as possible. EOD professionals will determine the threat to human health and the environment and the safety measures required. Do not return to work until EOD or other JBLM safety personnel determine the area is safe to enter. Include procedures for such scenarios with contact numbers in the Health and Safety Plan (HASP) for the fieldwork, per the Washington State Department of Labor and Industries requirements and JBLM Regulation 200-01.

6.15.3. Monitoring wells may be encountered during construction activities. Protect any monitoring wells encountered during construction activities against damage. Repair any monitoring well damaged in any way, at the Contractor's expense. Contact the COR if a monitoring well is encountered. The COR who will contact JBLM Environmental Restoration Program (Point of Contact: James Gillie [253-966-1774]) to determine the disposition of the well

6.15.4. Other environmental issues (i.e., underground storage tanks, transite (asbestos) piping, transformers, etc.) may be encountered during construction activities. Contact the COR if an environmental issue is encountered.

6.15.5. Land Use Controls: Contact the COR to determine if land use controls are in effect at the work area. These may include, but are not limited to, hazardous substances on site, restrictions on construction activities, and/or special worker health and safety requirements.

6.15.6. Hazardous Materials: Coordinate all hazardous materials with and obtain authorization from the JBLM Pollution Prevention Program or JBLM YTC Environmental Compliance prior to use on JBLM YTC. Provide hazardous material inventories , as specified in the documents referenced at 6.15.1, above.

6.15.7. Green Procurement: JBLM requires the purchase, supply, and use of environmentally preferable products and services. The JBLM Guide to Green Procurement for Construction is available for reference in the "Reference Manuals" section of the JBLM design standards webpage (http://designstandards.lewis.army.mil/index.htm). Additional information is available from the JBLM Green Procurement Program at 253-966-6466 or LEWISPWGreenProcurement@conus.army.mil.

6.15.8. Environmental Management System (EMS): Contractor shall be familiar with the JBLM environmental policy and shall ensure that this information is considered and incorporated into all projects. Maintain a copy of the policy on site. The installation policy can be found at https://sustainablefortlewis.army.mil/EMS/pdf/FL_EnvironmentalPolicy.pdf. Additional information on the installation EMS can be obtained by contacting the installation EMS coordinator at 253-966-6470.

6.15.9. Waste Procedures.

6.15.9.1. All procedures for solid waste, including hazardous waste, shall comply with the documents referenced at 6.15.1. This includes the submission of a nonhazardous solid waste diversion report to JBLM ED or to JBLM YTC ED. Prior to leaving JBLM, manifest all hazardous waste , as specified in the documents referenced at 6.15.1.

6.15.9.2. Turn in all construction and demolition scrap, in accordance with the latest JBLM Scrap Turn-In Policy Memorandum.

6.15.10. Spill Response (JBLM): Notify the JBLM fire department (dial 911) immediately in the event of a hazardous spill. The first person on scene that identifies the hazard must notify the fire department – this may or may not be the Contractor's designated POC.

6.15.10.1. After notifying the fire department, call JBLM PW Environmental Services (253-967-4786) and the COR.

6.15.10.2. The JBLM ED is responsible for contacting federal, state, and local reporting channels if a reportable quantity is released to the environment.

6.15.10.3. Provide a spill response plan for review by the COR and JBLM ED. List reporting channels, telephone numbers, and the hazardous materials stored on site and include copies of material safety data sheets for the hazardous materials and a site diagram outlining where the storage sites are located. All supervisors on site shall be trained in the execution of the spill plan. Document all training.

6.15.11. Contractor Generated Spills: Manage, store, dispose, and dispense petroleum products, hazardous materials, and hazardous wastes according to all federal, state, and local regulations (to include JBLM Installation Regulation 200-1).

6.15.11.1. Comply with all Washington State Department of Transportation (WSDOT) requirements associated with hazardous materials/hazardous waste, including proper container marking/labeling and vehicle placarding when transporting hazardous materials/hazardous waste on or off the installation.

6.15.11.2. Obtain Government approval prior to removal of any hazardous waste from the installation. Only an authorized hazardous waste transporter having an EPA Identification Number shall

remove the hazardous waste, and the waste shall be recorded on a Uniform Hazardous Waste Manifest (EPA Form 8700-22). An authorized representative of JBLM Environmental Services must sign all hazardous waste manifests prior to removal from JBLM. See documents referenced at 6.15.1 for more information..

6.15.12. SOLID WASTE DIVERSION PRACTICES

6.15.12.1. All construction activities at JBLM shall require at least 60 percent of construction and demolition materials such as excess lumber, roofing, drywall, carpet, piping, cardboard, etc., to be diverted from the landfill.

6.15.12.2. Government policy shall apply sound environmental principles in the design, construction, and use of facilities. As part of the implementation of that policy, the Contractor shall practice efficient waste management when sizing, cutting, and installing products and materials and shall use all reasonable means to divert construction and demolition waste from landfills and incinerators and facilitate their recycling or reuse.

6.15.12.3. Submit a waste management plan in accordance with Contract Section 01 57 20.00 10, Environmental Protection, and prior to initiating any site preparation work. In addition to the requirements in that Section, Include the following:

(a) Description of the specific approaches to be used in recycling/reuse of the various materials generated, including the areas and equipment to be used for processing, sorting, and temporary storage of wastes.

(b) Characterization, including estimated types and quantities, of the waste to be generated.

(c) Name of landfill and/or incinerator to be used and the estimated costs for use, assuming no salvage or recycling on the project.

(d) Identification of local and regional reuse programs, including JBLM programs and non-profit organizations such as schools, local housing agencies, and organizations that accept used materials such as materials exchange networks and Habitat for Humanity.

(e) List of specific waste materials to be salvaged for resale, salvaged and reused, or recycled. Identify recycling facilities to be used, including those on JBLM.

(f) Identification of materials that cannot be recycled/reused with an explanation or justification.

(g) Anticipated net cost savings determined by subtracting Contractor program management costs and the cost of disposal from the revenue generated by sale of the materials and the incineration and/or landfill cost avoidance.

6.15.13. CONTAMINATED SOILS: In the event that abnormalities, discolorations, odors, oil, or other signs of potential contamination by hazardous materials are encountered during excavation, soil borings, or other construction activities, stop work and notify the Government immediately. Coordinate with the JBLM ED Environmental Restoration Program. Follow with written notice within 24 hours, indicating date, time, and location of potential contaminants encountered. In the event contaminated soil is encountered, all field and laboratory technicians must be trained and certified for handling hazardous materials.

6.15.14. HISTORIC PROPERTIES: Stop work immediately and notify the COR and the JBLM Cultural Resources Program Manager if unidentified/unanticipated cultural resources are discovered/found during excavation or other construction activities.

6.16. PERMITS

6.16.1. The Government has obtained no permits/licenses to this project.

6.16.2. The Contractor shall obtain ALL permits/licenses required for this project. Submit permits to the Contracting Officer and PW ED to allow time for review and revisions with ultimate submittal at least 10 days before commencing removal activities. Provide amendments to the permits to the Contracting Officer and ED. The Contractor shall be responsible for determining fee basis and paying all filing fees.

6.16.3. Upon notice to proceed, immediately begin working required permits, and supporting information required by the Government to process permits.

6.16.4. DIG PERMITS. Obtain a dig permit from JBLM DPW (509-577-3407).

6.16.5. Complete all applications for the Clean Air permit and submit to JBLM ED for review. Once reviewed, incorporate changes and forward application and fee to the appropriate agency.

6.16.6. CONSTRUCTION GENERAL PERMIT (CGP): Construction sites that will have a land disturbance of one or more acres (or are part of a common plan of development that will disturb an acre or greater) or have multiple construction sites under one contract if the total land disturbance for all sites is greater than one acre, must be covered under the EPA's NPDES CGP if discharges enter, or have the potential to enter, surface waters of the United States or the JBLM stormwater system, which discharges to United States waters

6.16.6.1. Submit an NOI n accordance with the CGP. Obtain coverage prior to any land-disturbing activities.

6.16.6.2. Prepare a site-specific SWPPP and submit it to JBLM PW; it must be approved prior to submitting the NOI to the EPA. The SWPPP and the CGP must be followed as appropriate until final stabilization has occurred. The SWPPP is a living document and must be updated when site conditions change.

6.16.6.3. To stop permit coverage, submit a Notice of Termination (NOT) to the EPA. Submit a copy of the NOT to PW Stormwater Program.

6.16.6.4. If at any time permit conditions are not being met, contact JBLM PW Stormwater Program within 24 hours.

6.16.7. BORROW PIT AUTHORIZATION. See paragraph 6.4.8.

6.16.8. CRANE PERMITS. Crane Permits are obtained by contacting the Air Traffic Control Branch (253-966-6136). Provide notice of any crane activity at least 35 days prior to use.

6.16.9. TEMPORARY ROAD CLOSURES: Submit a traffic control plan in accordance with the Manual on Uniform Traffic Control Devices to the Contracting Officer for approval of any temporary road closures. After approval, provide 14 calendar days notice to the Government before the closure.

6.16.10. All permit applications must indicate the following address as the building and site owner:
JBLM PW
ATTN: IMNW-PWE
Box 339500 (Building 2012)
Joint Base Lewis-McChord, WA 98433-9500

6.16.11. Additional Required Project Specific Permits:

No additional permits required.

6.17. DEMOLITION

6.17.1. DISPOSAL, RECYCLING AND REUSE OF MATERIALS.: Waste material generated from the project may be recycled or reused on post in designated recycling and reuse areas. Dispose, recycle and reuse all other materials not designated for on post recycling or reuse off post at the Contractor's expense. JBLM recycling and reuse areas for the specified materials are as follows

(a) Sequalitchew Training Area and Center for Environmental Education and Earthworks ("Earthworks"). Materials accepted for recycling purposes are concrete, asphalt, brick, concrete block (if not painted with lead-based paint), rock, land clearing/clearing debris, and excess uncontaminated soil.

(b) Uncontaminated excavated or unsuitable soils are accepted at the following pits subject to availability and direction of JBLM PW, Sequalitchew, Gray Army Airfield Pit, East Gate Pit, and Lincoln Pit. Non-hazardous lead-contaminated soil (top 6 inches from designated areas) is accepted at former Landfill 2 subject to availability and direction from PW.

(c) Submit a "Borrow Source Use and Entry Notification Form" to dispose of uncontaminated soils within JBLM at the designated sites and under the direction of PW.

(d) Coordinate all recycling activities, disposal of materials on JBLM, and obtaining of permit forms through PW, Solid Waste and Recycling Program Manager JBLM PW/ED, ; Phone: (253) 966-6452; cell: (253) 377-1420; fax: (253) 967-9937; e-mail: ron.norton1@us.army.mil.

6.17.2. The Government maintains the right to salvage all materials from the building until the NTP date.

6.17.3. Assume that all demolition buildings will have no salvage value.

6.17.4. Fill depressions caused by the removal of demolished materials such as building pavements, sidewalks, utility lines, and pad, etc., to grade, compact per soil compaction requirements, and slope to drain towards the nearest appropriate structural stormwater management measure.

6.17.5. If fuel-contaminated soils are found during demolition or cut/fill operations, cease work immediately and notify either the Contracting Officer representative or the Contracting Officer for resolution that can include removal of the contaminated soil, filling, and capping area with clean, uncontaminated soil. Coordinate with JBLM ED to ensure proper classification and procedures prior to removal of contaminated soil.

6.17.6. ABANDONED UTILITIES: Locate and remove any abandoned utilities found onsite that may interfere with the site development or building.

6.17.7 Existing buildings 03112, 03114, 03115, 03116, 03118, 03119, 03121, 03122, 03123, 03124 and 03125 will be deconstructed as part of this project. This includes, but is not limited to: fencing the site; securing the site and buildings; a facility removal management plan; obtaining all permits; capping all utilities; hazardous material abatement including, but not limited to, asbestos-containing material (ACM), PCB light ballasts, fluorescent lights, mercury switches; ozone-depleting substances, low-level radiological waste (fire systems, exit signs), salvage, reuse, and recycle of building materials; facility removal and disposal of building material not diverted; removal and disposal of resulting rubbish and debris; lead-contaminated soil abatement (footprint plus dripline); restoration of the site to match existing conditions. See the demolition drawings located in Appendix C for building and site demolition. See Appendix DD for building demolition scope of work, demolition phasing schedules, hazardous material reports, builidng deconstruction design drawings and specifications.

6.18. ADDITIONAL FACILITIES

No additional facilities required.

End of Section 01 10 00.0010

SECTION 01 33 00.0010
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 three (3) copies of the submittal and return one (1) 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 one (1) copies of information only submittals.

End of Section 01 33 00.0010

SECTION 01 33 16
DESIGN AFTER AWARD

1.0 GENERAL INFORMATION

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1.2. DESIGNER OF RECORD

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3.0 EXECUTION

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3.5.2. Design Analyses

3.5.3. Geotechnical Investigations and Reports

3.5.4. LEED Documentation

3.5.5. Energy Conservation

3.5.6. Specifications

3.5.7. Building Rendering

3.5.8. Interim Building Design Contents

3.6. FINAL DESIGN REVIEWS AND CONFERENCES

3.7. FINAL DESIGN REQUIREMENTS

3.7.1. Drawings

3.7.2. Design Analysis

3.7.3. Specifications

3.7.4. Submittal Register

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

3.7.6. Acceptance and Release for Construction

3.8. DESIGN COMPLETE CONSTRUCTION DOCUMENT REQUIREMENTS

3.9. SUBMITTAL DISTRIBUTION, MEDIA AND QUANTITIES

3.9.1. Submittal Distribution and Quantities

3.9.2. Web based Design Submittals

3.9.3. Mailing of Design Submittals

3.10. AS-BUILT DOCUMENTS

ATTACHMENT A STRUCTURAL INTERIOR DESIGN (SID) REQUIREMENTS

ATTACHMENT B NOT USED

ATTACHMENT C TRACKING COMMENTS IN DRCHECKS

ATTACHMENT D SAMPLE FIRE PROTECTION AND LIFE SAFETY CODE REVIEW

ATTACHMENT E LEED SUBMITTALS

ATTACHMENT F BUILDING INFORMATION MODELING REQUIREMENTS

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. 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. Include the DCM procedures in the Design Quality Control Plan. 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 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) **34 X 24** Full Sets/ *Partial Sets	Design Analyses & Specs Full Sets/ *Partial Sets	Drawing Size (Half Size) **11 X 17** 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 **Seattle**	2/0	10/0	8/0	2	1	2	2
Commander, U.S.Army Engineer District, Center of Standardization **Fort Worth District**	0/0	4/0	4/0	6	N/A	1	5
Installation	4/4	4/0	4/0	3	2	2	2
U.S.Army Corps of Engineers Construction Area Office	2/0	6/0	6/0	2	1	1	2
Information Systems Engineering Command (ISEC)	0/0	0/1	0/0	1	N/A	N/A	1
Huntsville Engineer & Support Center, Central Furnishings Program	N/A	N/A	N/A	N/A	1 Interim/Refer to attachment B for the final submission Qty	N/A	N/A
Other Offices	11/2	12/0	12/0	12	N/A	2	2

***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

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 eight (8) 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. Unless otherwise noted, specify workstations and storage of steel construction. Provide high pressure laminate worksurface tops constructed to prevent warpage (thermallyfused worksurfaces are not acceptable). 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 commerical 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 commercial 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 with mitered solid wood edge of same wood type. 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. All task seating shall support up to a minimum of 250 lbs.

1.11.2. Desk and Guest Seating

Select ergonomic desk chairs with casters, 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.

1.12. 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.

raining tables shall be reconfigurable, moveable and storable; lighter weight folding with dollies or castered as necessary. Plastic laminate self edges are unacceptable. Specify power and data requirements and dollies as 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
Wood Desks - 10 year minimum

Metal Desks – 12 year minimum
Seating, unless otherwise noted - 10 year minimum
Seating Mechanisms and Pneumatic Cylinders - 10 years
Seating Fabric - 3 years minimum
Wood Filing and Storage - 10 year minimum

Tables, unless otherwise noted - 10 year minimum
Table Mechanisms – 5 year minimum
Table Ganging Device - 1 year minimum
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 and Contractor reviewers enter design review comments into DrChecks. Designers of Record shall annotate comments timely and specifically to indicate for the review conference exactly what action will be taken or why the action is not required. After the design review conference and prior to the next design submittal for the package, the DOR's will annotate those comments that require DOR action, design revision, etc. to show how and where it has been addressed in the design documents, This shall be part of the required design configuration management plan. 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 resolved prior to the next submittal. Print and include the DrChecks comments and responses and included in the design analysis for record in the next design submittal for that package.

2.1. Upon review of comments prior to the design review conference, the DOR(s) shall identify whether they concur, non-concur, mark it "for information only" or mark it "check and resolve". Indicate exactly what action will be taken or why the action is not required.

2.2. 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.

2.3. After the conference, the DOR(s) shall formally respond to each applicable comment in DrChecks a second time prior to the next submittal, clearly indicating what action was taken and what drawing/spec/design analysis changed. 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 submittal, reviewers will back-check answers to the comments against the new submittal, in addition to reviewing additional design work.

2.4. Clearly annotate in DrChecks those comments that, in the DB Contractor's opinion, require effort outside the scope of the contract. Do 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's 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 (Step 1 of 2)

The role of the DOR(s) is to evaluate and respond to the comments entered by the Government's and DB Contractor's reviewers. 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 radio button (concur, non-concur, for information only, or check and resolve) and respond with a brief explanation in the Discussion field. An explanation other than to say "concur" is not necessary for "Concur", but may be useful for the Design Configuration Management purposes.

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 Comment Evaluation (Step 2 of 2)

This is where the DOR(s) respond to each applicable comment in DrChecks after the design review conference, prior to the next submittal, clearly indicating what action was taken and what drawing/spec/design analysis changed. Respond to the previous comments, following the same steps as above, adding the narrative in the discussion field.

7.0 DrChecks Back-Check

At the following design conference, (where applicable) or at some other agreed time, Government and Contractor reviewers will back-check comment annotations against newly presented documents to verify that the designers' responses are acceptable and that all revisions have been completed. Reviewers

shall either enter additional back-check comments, if necessary, or close those where actions are complete.

7.1. Log into DrChecks.

7.2. Click on the appropriate project.

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

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

7.5. 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.

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

7.7. 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 Accessiblity 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 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

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**
			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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PAR		**FEATURE**	**DUE AT**		**REQUIRED DOCUMENTATION**	**DATE**	**REV**
			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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PAR		**FEATURE**	**DUE AT**		**REQUIRED DOCUMENTATION**	**DATE**	**REV**
			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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PAR		**FEATURE**	**DUE AT**		**REQUIRED DOCUMENTATION**	**DATE**	**REV**
			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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PAR		**FEATURE**	**DUE AT**		**REQUIRED DOCUMENTATION**	**DATE**	**REV**
			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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PAR		**FEATURE**	**DUE AT**		**REQUIRED DOCUMENTATION**	**DATE**	**REV**
			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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PAR		**FEATURE**	**DUE AT**		**REQUIRED DOCUMENTATION**	**DATE**	**REV**
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

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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

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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 05-31-2011

BUILDING INFORMATION MODELING REQUIREMENTS

1.0 Section 1 - General

1.1. Definitions. See Section 7 for definitions of terms used in this document.

1.2. Submittal Format

1.2.1. The Model shall be developed using Building Information Modeling ("BIM") supplemented with Computer Aided Design ("CAD") content as necessary to produce a complete set of Construction Documents. Printed design submittal drawings shall be 34 X 24 size, suitable for half-size scaled reproduction.

1.2.2. BIM submittals shall conform to the requirements of Sections 3 and 4 below.

1.2.3. For each Center of Standardization (CoS) facility type included in this Project, all Models and associated Facility Data shall be submitted in . The submittals shall be fully operable, compatible, and editable within the native BIM tools.

2.0 Section 2 – Design Requirements

2.1. Use of BIM for Design. Contractor shall use BIM application(s) and software(s) to develop Project designs consistent with the following requirements.

2.1.1. Baseline Model. The Contractor will not be provided a baseline multi-discipline BIM Project Model.

2.1.2. USACE BIM Workspace.

2.1.3. 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.

2.1.4. Industry Foundation Class (IFC) Support. The Contractor's selected BIM application(s) and software(s) must be consistent with the current IFC property sets. Any deviations from or additions to the IFC property sets for any new spaces, systems, and equipment must be submitted for Government acceptance.

2.1.5. BIM Project Execution Plan.

2.1.5.1. Develop a BIM Project Execution Plan ("Plan" or "PxP") documenting the BIM uses, analysis technologies and workflows.

2.1.5.2. Contractors shall utilize the link for the USACE BIM PROJECT EXECUTION PLAN (USACE PxP) Template located in Attachment H to develop an acceptable Plan.

2.2. BIM Requirements.

2.2.1. Facility Data. Develop the Facility Data to include material definitions and attributes that are necessary for the Project facility design and construction as described in Section 4.0. Additional data in support of Section 6.0 Contractor Electives is encouraged to be added to the Model.

2.2.2. Model Content. The Model and Facility Data shall include, at a minimum, the requirements of Section 4 below.

2.2.3. Model Granularity. Individual elements may vary in level of detail within the 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 on appropriately scaled civil drawings.

2.3. Output. Submitted Drawings (e.g., plans, elevations, sections, schedules, details, etc.) shall be derived (commonly known as extractions, views or sheets) from the Model and Facility Data. Drawings derived from the Model shall remain connected to the Model for the life of the Project and documented in the PxP. Drawings not derived from the Model shall also be documented in the PxP.

2.3.1. Drawings derived from the Model shall be compliant with the A/E/C CAD Standard. Deliver electronic CAD files used for the creation of the Construction Documents per requirements in Section 01 33 16, the criteria of the USACE Fort Worth District, and as noted herein.

2.3.2. The CAD file format specified for drawings shall not dictate which application(s) are used for development and execution of the Model and Facility Data. Application(s) used shall be documented in the PxP.

2.4. Quality Control Parameters. Implement quality control ("QC") parameters for the Model, including:

2.4.1. Model Standards Checks. QC validation ensures that the Project Facility Data set has no undefined, incorrectly defined or duplicated elements. Identify and report non-compliant elements and submit a corrective action plan. Provide the Government with detailed justification and request Government acceptance for any non-compliant element that the Contractor proposes to be allowed to remain in the Model.

2.4.2. CAD Standards Checks. QC checking ensures that the fonts, dimensions, line styles, levels and other construction document formatting issues are followed per requirements in Section 01 33 16. Identify and report non-compliant content and submit a corrective action plan.

2.4.3. Other Parameters. Develop such other QC parameters as Contractor deems appropriate for the Project and provide to the Government for acceptance.

2.5. Design and Construction Reviews. Perform design and construction reviews at each submittal stage under Section 3 to test the Model, including:

2.5.1. Visual Checks. Checking to ensure the design intent has been followed and that there are no unintended elements in the Model.

2.5.2. 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, code space requirements) in a written report and resolve.

2.5.3. 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.

2.5.4. Other Parameters. Develop other design and construction review parameters as the Contractor deems appropriate for the Project and provide to the Government for acceptance.

3.0 Section 3 – Submittal Requirements

3.1. General Submittal Requirements.

3.1.1. Provide submittals in compliance with the PxP deliverables at stages as described below.

3.1.2. For each Interim Design Submittal as set forth in Paragraphs 3.3 through 3.6, provide a Contractor-certified written report confirming that consistency checks as identified in Paragraphs 2.4 and 2.5 above 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 Interim Design Submittal as set forth in Paragraphs 3.3 through 3.6, provide the Government with:

3.1.3.1. The Model, Facility Data, Workspace and CAD Data files in the native BIM/CAD format.

3.1.3.2. A copy of the Model in an interactive review format such as Bentley Navigator, Autodesk Navisworks, Adobe 3D PDF 7.0 (or later), Google Earth KMZ or other format per PxP requirements. The format for reviews can change between submittals.

3.1.3.3. A list of all submitted electronic files including a description, directory, and file name for each file submitted. For all CAD printed sheets, include a list of the sheet titles and sheet numbers. Identify which files have been produced from the Model and Facility Data.

3.1.4. The Government shall confirm acceptability of all submittals identified in Section 3 in coordination with the USACE Geographic District BIM Manager.

3.2. Initial Design Conference Submittal.

3.2.1. Submit a digital copy of the PxP 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 into the PxP.

3.2.2. Within thirty (30) days after the acceptance of the PxP, conduct a demonstration to review the Plan for clarification, and to verify the functionality of planned Model technology workflow and processes. If modifications are required, the Contractor shall complete the modifications and resubmit the PxP performing a subsequent demonstration for Government acceptance. There will be no payment for design or construction until the PxP is completed and accepted by the Government. The Government may also withhold payment if there is design and construction for unacceptable performance in executing the accepted PxP.

3.3. Interim Design Submittals.

3.3.1. <u>BIM and CAD Data</u>. Submit the Model with Facility Data per the requirements identified in Paragraphs 2.2 and 2.3 as applicable to the Interim Design package(s).

3.4. Final Design Submissions and Design Complete Submittals.

3.4.1. <u>BIM and CAD Data</u>. Submit the Model with Facility Date per the requirements identified in Paragraphs 2.2 and 2.3. 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. <u>Construction Submittals – Over-The-Shoulder Progress Reviews</u>. 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-Built BIM and CAD Data Submittal. Submit the final Model, Facility Data, and CAD files reflecting as-built construction conditions for Government acceptance, 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 Model shall be developed to include the systems described below as they would be built, the processes of installing them, and to reflect final as-built construction 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 actual net square footage and net volume, and holding data to develop the room finish schedule including room names and numbers. Include program information 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(s) shall be developed in the Structural Model and then referenced by the Architectural Model.

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 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. All architectural specialties (i.e., toilet room accessories, toilet partitions, grab bars, lockers, and display cases) and millwork (i.e., cabinetry and counters) shall be accurately depicted with the necessary intelligence to produce accurate plans, elevations, sections and schedules 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 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, 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. Equipment shall be depicted to meet layout requirements with the necessary intelligence to produce accurate plans and schedules, indicating the configuration, materials, finishes, mechanical, and electrical requirements.. 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 with 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, related building/wall sections, and schedules.

4.5.4. Cast-in-Place Concrete. All walls, columns, 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. All 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. All shafts and pits, including necessary intelligence to produce accurate plans and building/wall sections depicting these design elements.

4.5.8. Openings and Penetrations. All major openings and penetrations that would be included on a quarter inch (1/4”=1’0”) scaled drawing.

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 to be depicted in the Model. Additional minimum Model requirements include:

4.6.1. HVAC. All necessary heating, ventilating, air-conditioning and specialty equipment, including air distribution for supply, return, ventilation and exhaust ducts, control systems, 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 Mechanical equipment clearances shall be modeled for use in interference management and maintenance access requirements.

4.6.4. Elevator Equipment. All necessary equipment and control systems, including necessary intelligence to produce accurate plans, sections and elevations depicting these design elements.

4.7. Electrical/Telecommunications. The Electrical and Telecommunications 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 to be depicted 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. All necessary special electrical components (i.e., security, mass notification, public address, nurse call and other special electrical occupancy sensors, and control systems), including necessary intelligence to produce accurate plans, details and schedules.

4.7.3. Grounding. All necessary grounding components (i.e., lightning protection systems, static grounding systems, communications grounding systems, and bonding), including necessary intelligence to produce accurate plans, details and schedules.

4.7.4. Telecommunications. All existing and new telecommunications 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 including all lighting fixtures, relevant existing and proposed support utility lines and equipment with necessary intelligence to produce accurate plans, details and schedules.

4.7.6. Equipment Clearances. All Electrical equipment clearances shall be modeled for use in interference management and maintenance access requirements.

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, with necessary connections to mains or other distribution points as appropriate, including necessary intelligence to produce accurate plans and profiles .

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, parking lots, and 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, as described in the proposal submission requirements and evaluation criteria, the requirements of paragraphs 6.2 through 6.5 are as applicable for those elective feature(s) that will be included in the project.

6.2. COBIE Compliance. The Model and Facility Data for the Project shall fulfill Construction Operations Building Information Exchange (COBIE) requirements on the Whole Building Design Guide website (www.wbdg.org) , including all requirements for the indexing and submission of Portable Document Format (PDF) and other appropriate records 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 PxP and during the Initial Design Conference Submittal Demonstration, 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 Stages identified in Paragraphs 3.3 through 3.6, the Contractor shall deliver the construction schedule 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 PxP and during the Initial Design Conference Submittal Demonstration, provide an overview of the use of BIM in the development and support of cost estimating, or other costing applications such as comparative cost analysis for proposed changes and estimate validation.

6.4.1. Submittal Requirements. During the Stages identified in Paragraphs 3.3 through 3.6, the Contractor shall deliver cost estimating information derived from the Model.

6.4.2. Project Completion. At Project completion, the Contractor shall provide an Micro Computer Aided Cost Estimating System Generation II ("MII") Cost Estimate that 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 Model output to the maximum extent possible, though other "gap" quantity information will be included by the contractor as necessary for a complete and accurate Cost Estimate. (See Paragraph 6.4.2.2).

6.4.2.1. Sub system level extracted quantities from the Model 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. When developing a Model, the contractor shall be cognizant of construction sequencing at the beginning stages of Model development, such as recognizing tasks performed 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 Model shall be broken down by their location (proximity in the structure) as well as the complexity of installation.

6.4.2.2. At all design Stages it shall be acknowledged that BIM output 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 alone. (An example of this would be plumbing that is less than 1.5" diameter and, therefore, not expected to be modeled due to permitted level of design granularity; this information is commonly referred to as "The Gap". Quantities addressing "The Gap" and their associated costs shall be included in the final Project actual Cost Estimates as well even though not derived directly from the Model data).

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 and other analyses that may be generated from the Model or reports summarizing the data compiled from these analyses shall be submitted in the form established by contractor in its accepted PxP.

7.0 Definitions

7.1. The following definitions apply specifically in the context of this attachment only.

7.2. "Model": An electronic, three-dimensional representation of facility elements with associated intelligent attribute data ("Facility Data").

7.3. "Facility Data": The non-graphical information attached to objects in the Model that defines various characteristics of the object. Facility Data can include properties such as parametric values that drive physical sizes, material definitions and characteristics (e.g. wood, metal), manufacturer data, industry standards (e.g. AISC steel properties), and project identification numbers. Facility Data can also define supplementary physical entities that are not shown graphically in the Model, such as insulation around a duct, or hardware on a door.

7.4. "Workspace": A collection of content libraries and supporting files that define and embody a BIM standard. A workspace includes BIM libraries such as wall types, standard steel shapes, furniture, HVAC fittings, and sprinkler heads. It also contains sheet libraries such as print/plot configurations, font and text style libraries, and sheet borders and title blocks. The USACE has developed Workspaces

specific to USACE BIM standards; these workspaces are dependent on specific versions of the BIM applications they serve. All USACE BIM Workspaces can be downloaded from the CAD/BIM Technology Center (https://cadbim.usace.army.mil). In some cases, there is a specific Workspace for a given CoS Facility Standard Design.

7.5. "IFC": Industry Foundation Class, a standard and file format used for the exchange of BIM data; see www.iai-tech.org. Note: In the context of this attachment, IFC does not mean "Issued For Construction."

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).	

ATTACHMENT H
USACE BIM Project Execution Plan (PxP) Template Version 1.0

This template is a tool that is provided to assist in the development of a USACE BIM Project Execution Plan as required per contract. The template provides a standard format for organizations to establish their general means and methods for meeting the scope and deliverable requirements in Attachment F. It was adapted from the buildingSMART alliance™ (bSa) Project "BIM Project Execution Planning" as developed by The Computer Integrated Construction (CIC) Research Group of The Pennsylvania State University. The bSa project is sponsored by The Charles Pankow Foundation, Construction Industry Institute (CII), Penn State Office of Physical Plant (OPP), and The Partnership for Achieving Construction Excellence (PACE). The template can be found at the following link:

https://mrsi.usace.army.mil/rfp/Shared%20Documents/USACE_BIM_PXP_TEMPLATE_V1.0.pdf

Please note: Instructions and examples to assist with the completion of this template are currently in grey. The text can and should be modified to suit the needs of the organization filling out the template. If modified, the format of the text should be changed to match the rest of the document. This can be completed, in most cases, by selecting the normal style in the template styles.

SECTION 01 45 04.00 10
CONTRACTOR QUALITY CONTROL

1.0 GENERAL

1.1. REFERENCES

1.2. PAYMENT

2.0 PRODUCTS (NOT APPLICABLE)

3.0 EXECUTION

3.1. GENERAL REQUIREMENTS

3.2. QUALITY CONTROL PLAN

3.3. COORDINATION MEETING

3.4. QUALITY CONTROL ORGANIZATION

3.5. SUBMITTALS AND DELIVERABLES

3.6. CONTROL

3.7. TESTS

3.8. COMPLETION INSPECTION

3.9. DOCUMENTATION

3.10. NOTIFICATION OF NONCOMPLIANCE

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 at the site, responsible for the overall site activities, including but not limited to 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. Different contractors have different names for the on-site overall project supervisor. For clarification, the term “site project superintendent” refers to the Contractor’s senior site representative or “on-site manager”, or other similar title, as those terms are used in contract Clause 52.236-7, “Superintendence by the Contractor” and in the Division 00 Section(s) of the solicitation for this contract or task order,.or elsewhere in the contract. It does not refer to a construction superintendent, unless that person is also the Contractor’s permanently assigned senior site representative in charge of all on-site activities.

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.

3.2.2.4. 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. Include the DCM plan as a subset of the DQC Plan. See Section ‘Design After Award’.

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 Seattle District. 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:

  Government-contract laboratory designated by the Area Office

  Not Applicable

  Not Applicable

Not Applicable

- For other deliveries:

  Government-contract laboratory designated by the Area Office

  Not Applicable

  Not Applicable

  Not Applicable

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 02.0010
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 02.0010

APPENDIX A
GEOTECHNICAL REPORT

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Geotechnical Report
Barracks FY 11 PN064457
Joint Base Lewis-McChord, Washington

January 17, 2011

Submitted To:
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Berger ABAM
33301 Ninth Avenue, Suite 300
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By:
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21-1-21368-003

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GEOTECHNICAL REPORT
BARRACKS FY 11 PN064457
JOINT BASE LEWIS-MCCHORD, WASHINGTON

1.0 INTRODUCTION

This report presents geotechnical engineering conclusions and recommendations for the Pendleton Barracks FY 11 PN064457 project at Joint Base Lewis-McChord (JBLM), Washington. This report presents a summary of test pit and boring explorations, a pilot infiltration test (PIT), subsurface soil conditions, laboratory testing, and the results of engineering studies and analyses.

Our scope of services included a reconnaissance of the site on April 19, 2009; excavation and soil sampling of 22 test pits on May 10 to 11, 2010; a PIT and drilling of three borings on November 22, 2010; and, on December 1, 2010, laboratory testing and preparation of this report. Our initial work was completed in general accordance with Proposal for Geotechnical Services, PN 064457, dated March 16, 2010. Three soil borings were drilled on November 22 and December 1, 2010, for signal pole foundations at 2nd, 3rd and 4th Division Drives along Pendleton Avenue. These borings were completed in general accordance with our proposal dated November 17, 2010.

This is a multiphase project; however, we have evaluated the entire property, which is approximately 20 acres.

2.0 PROJECT DESCRIPTION

The location of the JBLM Pendleton Barracks project site is shown in the Vicinity Map, Figure 1. The current phase project will include developing one new barrack site and upgrading three surrounding roadways, as shown in Figure 2.

The barracks site will be located at the southeast corner of the intersection of Pendleton Avenue and 2nd Division Drive; cover about five acres; and include four buildings, a courtyard, two sports courts, and off-street parking accessible from 3rd Division Drive.

The roadways improvement will be a total of 3,850 lineal feet or about three-quarters mile and will include Pendleton Avenue between 2nd and 3rd Division Drive (about 900 feet) and Pendleton Avenue extending about 250 feet west of 2nd Division Drive and 600 feet northeast of 3rd Division Drive to 4th Division Drive. 2nd Division Drive and 3rd Division Drive

improvements will be between Pendleton Avenue and Bennett Avenue (about 2,100 feet). Signals will be constructed at 2nd and 3rd Division Drives where they intersect Pendleton Avenue and at the intersection of 4th Division Drive and Jackson Avenue.

3.0 SITE DESCRIPTION

The site is presently occupied by existing roadways and structures and covers approximately 20 acres. The site is roughly bound by Pendleton Avenue, Bennett Avenue, 2nd Division Drive, and 3rd Division Drive.

Nine structures line the perimeter of the site and an approximately 300- by 450-foot parking lot and obstacle course accessible from 2nd Division Drive are located in the middle of the site. Two smaller parking lots exist among the buildings south of Pendleton Avenue. Single-stall parking is located along the north side of Bennett Avenue and a parking lot is located on the southwest corner of Pendleton Avenue and 2nd Division Drive. Scattered native and planted trees exist along the roadways and among the buildings. Multiple courtyards are located between the existing buildings. There are no existing structures along the proposed roadway improvement area south of Pendleton Avenue between 3rd Division Drive and 4th Division Drive. This area is occupied by trees and grass. Topographic relief is less than about 3 feet over the entire site. Standing water or signs of erosion were not observed.

4.0 FIELD EXPLORATIONS

To generally characterize subsurface conditions across the FY11 Barracks project site, 22 test pits were excavated on May 10 to 11, 2010, and three borings at the signal pole locations were drilled on November 22 and December 1, 2010. A description of the methodology and procedures used to excavate test pits, drill borings, and sample the explorations are discussed in Attachment A, Field Explorations. The criteria used for the soil description and the terminology used for describing the relative density of the granular soils included on the soil logs are shown in the Soil Classification and Log Key, Figure A-1. Detailed descriptions of the soil encountered in the test pits are presented in Figures A-2 through A-23 in Attachment A. Descriptions of the borings are presented in Figures A-24 through A-27 in Attachment A.

One PIT, designated PIT-1, was performed to estimate a potential infiltration rate of the site soil and to assist in the design of the FY11 Barracks stormwater management facilities.

The approximate locations of the test pits, borings and the PIT are shown in the Site and Exploration Plan, Figure 2.

5.0 LABORATORY TESTING

To aid in our engineering analyses, laboratory tests were performed on selected samples retrieved from the test pit excavations to determine basic index and engineering properties of the soils encountered. The geotechnical laboratory testing was performed in the Shannon & Wilson laboratory in Seattle, Washington, and included visual classification, water content determination, and grain size distribution. Results are presented in Figure B-1 of Attachment B. Geotechnical laboratory testing was performed in general accordance with the ASTM International (ASTM) (2007) standard test procedures.

Descriptions of the test procedures and summaries of the test results are presented in Attachment B.

6.0 SUBSURFACE CONDITIONS

6.1 General

The soil encountered at JBLM consists of glacially derived sediment deposited during the Pleistocene (Vashon Stade) Fraser glacial retreat that ended about 12,000 years ago. As the melting glacier receded, the underlying soil was washed by glacial meltwater. This recessional outwashing resulted in thick deposits of cobbly sand and gravel relatively free of silt and clay. A broad outwash plain of sand and gravel covers the JBLM region and was encountered in all test pit excavations. Outwash plains were vegetated with conifer forests and mantled with a topsoil layer produced from weathering of the surficial soil deposits and an accumulation of tree and plant debris.

6.2 Anticipated Geologic Units

Subsurface conditions were characterized using logs of 22 test pit excavations. Subsurface soils encountered in test pit excavations included topsoil, Holocene fill (Hf) deposits, and Quaternary Vashon recessional outwash (Qvro). Hf is usually disturbed material placed during construction of buildings and roads and typically derived from native soils.

Qvro generally consists of clean sands and gravels with trace amounts of silt and clay. In localized areas of increased fine-grained sediments, cementation may bind the sands and gravels together, forming a rigid, dense layer of lower permeability.

- A coarser-grained outwash common in the JBLM region is the Steilacoom Gravel (Qs). Qs is generally distinguished from Qvro by the increased presence of boulders and cobbles and

negligible amounts of finer-grained sediments. This open framework soil has a high permeability and can show minor to severe caving when excavated.

The base of recessional deposits coincides with the top of glacially overridden soils. Overridden glacial units were not observed during the subsurface explorations and are not anticipated at the site.

6.2.1 Topsoil

Topsoil at the project site consists of loose, dark brown to black, gravelly, sandy silt (ML) with abundant organics and abundant fine roots. Fine roots generally penetrate the full depth of the silt imparting an organic characteristic to this material. This is low-plasticity silt.

6.2.2 Fill (Hf)

Fill material encountered in the test pits consists of medium dense to very dense, light brown to dark brown, sandy, silty gravel (GM) and silty, gravelly sand (SM). Fill will be found within existing and abandoned utility trenches and near existing structures and natural low areas filled during previous site grading. Fill soil is generally native silt, sand, and gravel frequently mixed with organic material derived from topsoil layers. Fill and Qvro are generally the same soil types. Fill material is distinguished from Qvro by distinct soil layers with dissimilar color, texture, and consistency and may contain abundant roots and organics.

6.2.3 Recessional Outwash (Qvro)

Qvro is medium dense to very dense, light brown to dark brown and red-brown, sandy, silty gravel (GM); medium to coarse sand (SP); and sandy gravel to gravelly sand (GW, SW). Qvro contains variable amounts of cobbles and scattered boulders generally increasing with depth and occasional abundant roots and organics. Stratification and interbedding with layers and seams of fine gravel and fine to coarse sand are common. Gray-brown, slightly clayey to clayey, sandy gravel (GC) and clayey, gravelly sand (SC) were occasionally encountered at the project site, although clay is not a common matrix found within Qvro.

Groundwater fluctuation within Qvro can precipitate iron and manganese oxides. Such oxidized sands and gravels have an increased strength and a decreased permeability. At the project site, it is typically recognized as dark brown, sandy, silty gravel (GM).

The sidewalls of test pits excavated into clean sands and gravels (with no silt or fine sand binder) caved easily during test pit excavation.

6.2.4 Steilacoom Gravel (Qs)

Qs is medium dense to very dense, light brown, sandy gravel (GW) with cobbles and occasional boulders. Variable amounts of silt and clay may be found within Qs layers but will predominantly contain coarse gravels, cobbles, and possibly boulders. Unless bound by these finer sediments, Qs can easily cave during excavation.

6.3 Groundwater

Test pits were excavated to depths of approximately 5.0 to 10.0 feet. Soil samples were classified as moist and groundwater was not observed in any of the test pits. Explorations were made in early May when groundwater can fluctuate greatly with the weather. It is possible that during prolonged wet weather conditions, the groundwater level could be exposed at these shallow depths near 10 feet.

7.0 SITE SUBSURFACE CONDITIONS

7.1 General

Discussion of the subsurface soil conditions is separated into five sections: Pendleton Avenue, 2nd Division Drive, 3rd Division Drive, Bennett Avenue, and Barracks. The Barracks section includes the proposed construction of the FY11 Barracks, two Sports Courts, and an Off-street Parking lot. Locations of soil explorations, roadways, and proposed structures are shown in the Site and Exploration Plan, Figure 2.

7.2 Pendleton Avenue

Subsurface soil conditions along Pendleton Avenue were characterized using the logs of five test pits, designated TP-1, TP-5, TP-13, TP-14, and TP-16. Soil encountered along Pendleton Avenue consists of topsoil, Fill, Qvro, and Qs.

Topsoil is 0.4 to 0.6 foot thick and consists of loose to medium dense, dark brown, slightly gravelly to gravelly, sandy silt (ML) with organic matter. Scattered tree roots were encountered at TP-1.

Fill material is 1.2 feet thick and consists of medium dense to dense, dark brown, sandy, silty gravel (GM) with scattered fine roots. Fill material was not encountered at TP-1, TP-5, TP-14, or TP-16.

Qvro underlies the topsoil and fill and is 0.3 to 1.9 feet thick. Qvro is medium dense to dense, light gray-brown to red-brown and light brown to dark brown, sandy, silty gravel (GM) with scattered cobbles and fine roots. At TP-13, Qvro consists of gravelly, medium to coarse sand (SP).

Qs is found below the topsoil, fill, and Qvro from 0.8 to 3.5 feet below ground surface (bgs). Qs consists of medium dense to dense, light brown, sandy, cobbly gravel (GW). Trace amounts of silt are found in TP-5 and TP-16. Scattered roots were encountered to 3.0 feet bgs at TP-1 and moderate caving occurred from 1.2 to 3.0 feet at TP-5. Qs persists to the bottom of each test pit to a depth of 6.2 feet.

Groundwater was not encountered.

7.3 2nd Division Drive

Subsurface conditions along 2nd Division Drive were characterized using the logs of six test pits designated TP-2 through TP-4 and TP-6 through TP-8. Soil encountered along 2nd Division Drive consists of topsoil, Fill, Qvro, and Qs.

Topsoil is 0.5 to 0.8 foot thick and consists of loose, dark brown, slightly gravelly, sandy silt (ML) with abundant organic matter. Scattered tree roots were encountered at TP-4 and TP-8 and abundant tree roots were encountered at TP-2.

Fill material was encountered at TP-6 and TP-7. Fill is 0.3 to 1.4 feet thick consisting of medium dense to very dense, light brown to dark brown, silty, sandy gravel (GM). TP-6 contains abundant organic matter.

Qvro underlies the topsoil and fill at 0.6 to 2.0 feet bgs and is 0.9 to 8.5 feet thick. Qvro consists of medium dense to very dense, light brown, red-brown, gray-brown and dark brown, sandy, silty gravel (GM), gravelly sand (SW) to sandy gravel (GW), and fine to coarse sand (SP). At TP-6, Qvro consists of slightly clayey to clayey, sandy gravel from 1.3 to 1.8 feet. Abundant organic matter was encountered at TP-2 and caving occurred from 3.0 to 6.0 feet in TP-3. Scattered cobbles were encountered in TP-3 and TP-8. Qvro was not encountered at TP-4.

Qs is found below the topsoil, fill, and Qvro from 0.5 to 4.0 feet bgs. Qs consists of medium dense to very dense, light brown, sandy, cobbly gravel (GW). Trace amounts of silt are found in TP-4 and TP-7. Qs persists to the bottom of TP-2, TP-4, TP-6, and TP-7 to a depth of 10.0 feet and was not encountered in TP-3 or TP-8.

Groundwater was not encountered.

7.4 3rd Division Drive

Subsurface conditions along 3rd Division Drive were characterized using the logs of three test pits designated TP-11, TP-12, and TP-15. The soil encountered consists of topsoil, Fill, Qvro, and Qs.

The topsoil is 0.3 to 0.6 foot thick and consists of loose, dark brown, slightly gravelly to gravelly, sandy silt (ML) with organic matter. Scattered tree roots were encountered at TP-15.

Fill material underlies topsoil and is 0.4 to 1.7 feet thick. Fill material consists of medium dense to dense, light to dark brown and red-brown, slightly silty to silty, sandy gravel (GW-GM) with fine roots. At TP-12, fill material consists of brown, slightly silty, gravelly, medium sand (SP-SM) with occasional cobbles. Trace amounts of wood debris were encountered from 1.0 to 1.6 feet at TP-11. At TP-15, scattered tree roots were encountered from 0.3 to 2.0 feet and a boulder was encountered at 2.0 feet.

Qvro underlies topsoil and fill from 1.0 to 2.0 feet bgs and is 1.8 to 2.6 feet thick. Qvro is medium dense to dense, dark brown and gray-brown, silty, sandy gravel (GM). At TP-11, Qvro is brown-gray, silty, sandy gravel (GM) with a trace of clay from 1.6 to 2.2 feet and light brown, slightly sandy to trace sandy gravel (GW) from 2.2 to 3.5 feet. At TP-12, Qvro is red-brown, slightly clayey to clayey, sandy gravel (GW-GC) from 1.0 to 1.8 feet. Occasional tree roots, cobbles, and boulders were encountered at TP-15 and moderate caving occurred at TP-12.

Qs underlies topsoil, fill, and Qvro from 3.5 to 3.8 feet bgs. Qs consists of medium dense to dense, light brown, sandy, cobbly gravel (GW). A 1.8-foot-thick layer of light gray-brown, clayey gravel (GC) with cobbles was encountered at TP-12 from 1.8 to 3.6 feet. Trace amounts of silt were encountered in TP-15. Moderate caving occurred at TP-12. Qs persists to the bottom of each test pit to a depth of 6.5 feet.

Groundwater was not encountered.

7.5 Bennett Avenue

Subsurface conditions along Bennett Avenue were characterized using soil logs from three test pits designated TP-9, TP-10, and TP-20. The soil encountered consists of topsoil, fill, and Qvro.

The topsoil is 0.6 foot thick and consists of loose, dark brown, slightly gravelly, sandy silt (ML) with organic matter.

Fill material is 0.4 to 0.8 foot thick. At TP-9, fill consists of medium dense to dense, light brown to brown, silty, gravelly sand (SM) to silty, sandy gravel (GM) with occasional organic matter. At TP-20, fill consists of medium dense to dense, light brown, sandy gravel (GW) with abundant fine roots and scattered cobbles. Fill was not encountered in TP-10.

Qvro underlies topsoil and fill from 0.6 to 1.4 feet bgs. Qvro consists of medium dense to very dense, light brown to dark brown, silty, sandy gravel (GM) and silty, gravelly sand (SM) with occasional cobbles. At TP-9, Qvro consists of medium dense, brown, medium sand (SP) from 3.0 to 4.5 feet and very dense, light brown, slightly clayey, gravelly sand (SW-SC) with occasional boulders from 4.5 feet. At TP-20, Qvro consists of medium dense to dense, light brown to brown, gravelly, medium to coarse sand (SP). Occasional fine roots exist in TP-20. Qvro persists to the bottom of each test pit to a depth of 6.5 feet.

Qs was not encountered in any of the test pits. Groundwater also was not encountered.

7.6 Barracks

Subsurface conditions at the proposed FY11 Barracks, Sports Courts, and Off-street Parking Lot were characterized using soil logs from five test pits designated TP-17, TP-18, TP-19, TP-21, and TP-22. The soil encountered consists of topsoil, fill, Qvro, and Qs.

Topsoil is 0.4 to 0.6 foot thick and consists of loose, dark brown, sandy silt (ML) with organic matter. Topsoil was not encountered at TP-19.

Fill material is 0.4 to 0.8 foot thick. At TP-19, fill consists of loose, brown, silty, fine sand (SM) with occasional fine organic matter. At TP-22, fill consists of medium dense, red-brown, slightly silty, sandy, coarse gravel (GP-GM) with abundant fine roots. Fill was not encountered at TP-17, TP-18, or TP-21.

Qvro underlies the topsoil and fill at 0.4 to 0.6 foot bgs and is 1.4 to 2.1 feet thick. At TP-22, Qvro underlies topsoil, fill, and Qs. Qvro consists of medium dense to very dense, light brown to dark brown and gray-brown, slightly silty to silty, sandy gravel (GW-GM) and silty, gravelly sand (SM) with scattered cobbles. Occasional boulders and moderate caving were encountered at TP-2. Qvro persists to the bottom of TP-21 and TP-22 to a depth of 10.0 feet and was not encountered at TP-18.

Qs underlies topsoil, fill, and Qvro from 0.5 to 2.5 feet bgs, except at TP-22, where Qvro underlies Qs and Qs is 2.8 feet thick. Qs consists of medium dense to dense, light brown, sandy, cobbly gravel (GW). At TP-17, Qs consists of very dense, light gray-brown, slightly clayey, sandy gravel (GW-GC) and grades to sandy, cobbly gravel (GW). Occasional boulders were encountered at TP-18. Qs persisted to the bottom of TP-17, TP-18, and TP-19 to a depth of 6.0 feet and was not encountered in TP-21.

Groundwater was not encountered.

7.7 Signal Poles

Three signal poles have been proposed along Pendleton Avenue as part of the roadway improvements for this project. The poles would be located at 2nd and 3rd Division Drives where each intersects Pendleton Avenue and at the intersection of 4th Division Drive and Jackson Avenue.

7.7.1 2nd Division Drive

Subsurface conditions at the signal pole location at Pendleton Avenue and 2nd Division Drive are interpreted from explorations B-3 and TP-1. Soils encountered at these locations consisted of topsoil, Qvro, and Qs.

Topsoil was observed to be about 0.5 feet thick and was covered by sod at the ground surface. The topsoil appeared to consist of dark brown, sandy silt (ML) with thin tree roots observed in TP-1.

Qvro underlies the topsoil and was observed to be 1.8 feet thick. Qvro consists of medium dense to very dense, light brown, red-brown, gray-brown and dark brown, sandy, silty gravel (GM), gravelly sand (SW) to sandy gravel (GW), and fine to coarse sand (SP). Abundant organic matter was encountered at TP-1

Steilacoom gravel (Qs) is found below the topsoil, and Qvro to 6.0 feet bgs. Qs consists of medium dense to very dense, light brown, sandy, cobbly gravel (GW). Trace silt was observed in the gravel at about 12.5 feet and trace iron oxide staining was present at 22.5 to 24 feet. Groundwater seepage was not observed in either exploration.

7.7.2 3rd Division Drive

Subsurface conditions at the signal pole location at Pendleton Avenue and 3rd Division Drive are interpreted from explorations B-1 and TP-14.

Topsoil was observed to be about 0.4 foot thick and was covered by sod at the ground surface. The topsoil appeared to consist of dark brown, slightly gravelly, sandy silt (ML) with thin tree roots observed in TP-14.

Fill material was observed to be about 0.4 to 0.8 foot thick. At TP-19, fill consists of loose, brown, silty, fine sand (SM) with occasional fine organic matter. At TP-22, fill consists of medium dense, red-brown, slightly silty, sandy, coarse gravel (GP-GM) with abundant fine roots. Fill was not encountered at TP-17, TP-18, or TP-21.

Qvro underlies the topsoil and fill and was observed to be about 1.8 feet thick. Qvro consists of medium dense to dense, brown, sandy, silty gravel (GM), gravelly sand (SW) to sandy gravel (GW), and fine to coarse sand (SP). Abundant organic matter (fine roots) was encountered at TP-14.

Qs was observed below the topsoil, fill, and Qvro to 6.0 feet bgs. Qs consists of medium dense to very dense, light brown, sandy, cobbly gravel (GW). A saturated layer was observed in B-1 at about 16 feet and iron oxide staining was also present at this depth.

7.7.3 4th Division Drive

Subsurface conditions at the signal pole location at Pendleton Avenue and 4th Division Drive are interpreted from explorations B-2 and TP-13.

Topsoil was observed to be about 0.4 foot thick and was covered by sod at the ground surface. The topsoil appeared to consist of dark brown, sandy silt (ML) with thin tree roots observed in TP-1.

Fill material is 0.4 to 0.6 foot thick. At TP-13, fill consists of loose, brown, silty, fine sand (SM) with occasional fine organic matter.

Qvro underlies the topsoil and was observed to be 1.8 feet thick. Qvro consists of medium dense to very dense, light brown, red-brown, gray-brown and dark brown, sandy, silty gravel (GM), gravelly sand (SW) to sandy gravel (GW), and fine to coarse sand (SP). Abundant organic matter was encountered at TP-1.

Qs is found below the topsoil, and Qvro to 6.0 feet bgs. Qs consists of medium dense to very dense, light brown, sandy, cobbly gravel (GW). Trace iron oxide staining was present from 12.5 to 14 feet in B-2. Blow counts at this location were low from 5 to 11.5 feet, possibly indicating a loose zone of fill or native soils. Groundwater seepage was not observed in either exploration.

8.0 PILOT INFILTRATION TEST (PIT) ANALYSIS

8.1 Stormwater Infiltration

This section describes the results of the PIT evaluation for the FY11 Barracks Project at Joint Base Lewis-McChord, Washington. Our evaluation is based on data collected during recent field infiltration testing at PIT-1. Field infiltration testing was performed to assist in the design of stormwater management facilities by evaluating the infiltration capacity of the soil in the project area.

8.1.1 Field Exploration and Testing

PIT-1 was a 5-foot-wide, 6.5-foot-long, and 2.5-foot-deep test PIT-1 and was excavated near TP-3, as shown in Figure 2, Site and Exploration Plan. Our explorations for this project in and near PIT-1 indicate the presence of sandy gravel with a trace of silt, and scattered to abundant cobbles.

A Shannon & Wilson field representative performed falling-head infiltration tests in PIT-1 on May 10, 2010. The field infiltration testing was performed in general accordance with guidelines and procedures for determining design infiltration rates presented in the Pierce County (County) Stormwater Management and Site Development Manual (Manual) (2008).

A falling-head test consists of injecting water into the pit until a steady state is achieved; i.e., the flow rate into the pit and the water level inside the pit reach constant values. Once steady-state conditions are achieved, water injection is stopped and the subsequent rate of the "falling" water level is monitored. Water level data during injection and the falling-head tests were recorded using a Minitroll™ data logger/pressure transducer system, which was placed at the bottom of PIT-1 during testing.

Water for infiltration testing in PIT-1 was supplied from a hydrant near the testing location. The flow rate for infiltration testing at PIT-1 was about 120 gallons per minute, which was measured by timing the filling of a 5-gallon bucket.

Three falling-head infiltration tests were performed in PIT-1. Steady-state water levels of about 7 to 8 inches were generated for each of the three falling-head tests in PIT-1.

8.1.2 Infiltration Rate Evaluation

Infiltration rates were estimated from data obtained during our exploration and testing program using standard hydrogeologic methods and recommendations from the County Manual.

Figure B-2 presents a plot of the falling-head test data from PIT-1 that shows change in hydraulic head in inches versus elapsed time in hours. Falling-head test data from PIT-1 show an approximately linear falling-head during the tests. The slopes of the regression lines fitted to the falling-head data indicate relatively high short-term infiltration rates of greater than 200 inches per hour (in/hr) for PIT-1.

The County Manual recommends using a long-term design infiltration rate of 10 in/hr for soil classified as clean sandy gravel and gravelly sand using the U.S. Department of Agriculture (USDA) Soil Textural Classification described in the County Manual. Using this classification system, the soil observed in PIT-1 is classified as clean, sandy gravel.

We also estimated long-term infiltration rates for a soil sample from PIT-1 based on the d_{10} grain size from the ASTM D422 gradation as described in the County Manual. This results in long-term infiltration rate of 9 in/hr. The grain size distribution plot for the closest test pit (TP-3) is shown in Figure B-2.

8.2 Infiltration Design Recommendations

The potential infiltration rates estimated from infiltration testing and grain size analyses indicate that the shallow soils within the FY11 Barracks Project area are variable, but readily transmit water and are generally suitable for infiltration.

The results of the field infiltration testing in PIT-1 indicate short-term infiltration rates greater than 200 in/hr. In our opinion, the short-term infiltration rate should be reduced by a correction factor to account for degradation of the infiltrating soil over time, soil variability, and facility maintenance. The maximum long-term design infiltration rate shown in the County Manual is 10 in/hr for clean, sandy gravel using the USDA Soil Textural Classification, and 9 in/hr based on the ASTM grain size method. However, based on the relatively high short-term infiltration rate of at least 200 in/hr derived from filed testing, we recommend a long-term design infiltration rate of 20 in/hr for proposed stormwater facilities in the vicinity of PIT-1.

We recommend the long-term infiltration rates used for design of each facility be from the nearest exploration, given the distance between test pits and the potentially variable infiltration capacity of the soils.

Occasionally, seams of cemented Qvro were encountered near the ground surface in the explorations and consist of very dense, silty, sandy gravel and silty sand (GM and SM). In our opinion, this cemented Qvro is a poor infiltration receptor and should be removed to expose uncemented Qvro in the locations of proposed infiltration facilities.

9.0 ENGINEERING CONCLUSIONS AND RECOMMENDATIONS

9.1 General

This report provides geotechnical engineering conclusions and recommendations for the following items:

- Site preparation
- Foundation design and allowable bearing pressure
- Estimated settlements
- Lateral earth pressures
- Lateral resistance
- Base footing friction
- Seismic criteria
- Floor slabs
- Subdrainage
- Traffic signal standard foundations
- Pavement design
- Fill placement compaction and use of on-site soil
- Imported structural fill
- Temporary and permanent excavation slopes
- Groundwater control
- Construction considerations

9.2 Site Preparation

Topsoil is loose and organic and should be removed from the site where construction is planned, except in landscape areas where settlements would not be objectionable. Our explorations encountered topsoil and roots generally ranging from 0.0 to 0.8 foot thick. Average topsoil thickness across the project site is 0.5 foot. Where trees are encountered, stripping depth would likely increase in order to remove tree stumps and large roots, depending on the size of the trees.

Fill material was encountered near the ground surface in 10 of 22 test pits and ranges from 0.0 to 2.0 feet deep and averages about 1.3 feet deep. The fill is generally Qvro sandy, silty gravel (GM) to gravelly sand (SW) and Qs sandy, cobbly gravel (GW), mixed with varying amounts of organic matter. Some of the soil classified as fill is not suitable for use for structural, roadway embankment, or utility backfill because it contains significant amounts of organic matter. Unsuitable fill should be removed from areas that require structural or pavement support and should be disposed of as topsoil. However, most of the fill soil encountered is sandy, silty gravel (GM) without significant amounts of organic materials (roots, tree roots, etc.) or deleterious materials (brick, concrete, pipe, etc.). This material is suitable for reuse as compacted fill, provided it is placed at optimum moisture content. Silty gravel (GM) fill soil is difficult or impossible to place and compact when wet or during wet weather. A summary of soil conditions is presented in Table A-1.

Fill density as encountered in the test pits is generally medium dense to dense. When encountered during excavation, fill material may require removal down to undisturbed, recessional outwash, the exposed surface prepared as described subsequently in this section, and then reused, provided significant organics are not encountered. Abundant organics and roots were encountered in test pits TP-6, TP-11, TP-12, TP-20, and TP-22; tree roots in TP-15; cobbles in TP-20. Soil in the vicinity of these test pits should be evaluated by a geotechnical engineer and may require possible removal and replacement. Cobbles (rocks greater than 3 inches) should be mixed with Qvro if used as fill. Qvro is medium dense to very dense and generally suitable material for pavement support or as structural and utility backfill, provided it is evaluated by a geotechnical engineer during the time it is exposed, excavated, placed, or compacted.

Because of variable soil conditions across the site, stripping depths, fill thickness, and elevation to suitable bearing soil will vary. Table 1 lists the estimated stripping depth and thickness of fill at the listed locations based on the test pit logs.

In our opinion, most fill material and Qvro do not contain significant organic or other deleterious material so they are suitable to support the proposed roadway embankments and structures. Soils consisting of topsoil and fill material containing roots and organic matter greater than 10 percent by volume or 6 percent by weight (in accordance with ASTM D 2974) are unsuitable for use as fill material. The organic content by volume (10 percent or greater) is intended as a general description for visual classification in the field. ASTM D 2974 (Organic Content of Soil) test method should be applied to confirm actual organic content in determining suitability of large

quantities of soils for use as fill. On-site soil used for structural fill should be evaluated by a geotechnical engineer prior to use.

TABLE 1
ESTIMATED STRIPPING DEPTH AND FILL THICKNESS

Proposed New Construction	Test Pit Number	Stripping Depth (feet)	Fill Thickness (feet)
Pendleton Avenue	TP-1	2.3	0.0
	TP-5	0.5	0.0
	TP-13	0.4	1.2
	TP-14	1.3	0.0
	TP-16	0.6	0.0
2nd Division Drive	TP- 2	1.5	0.0
	TP-3	0.5	0.0
	TP-4	0.5	0.0
	TP-6	0.8	0.3
	TP-7	0.6	1.4
	TP-8	0.8	0.0
3rd Division Drive	TP-11	1.6	1.1
	TP-12	1.0	0.4
	TP-15	0.3*	1.7
Bennett Avenue	TP-9	0.6	0.4
	TP-10	0.6	0.0
	TP-20	1.4	0.8
FY11 Barracks, Sports Courts and Off-Street Parking	TP-17	0.6	0.0
	TP-18	0.5	0.0
	TP-19	0.4	0.4
	TP-21	0.4	0.0
	TP-22	1.2	0.8

Note:
* Tree roots require deeper stripping (2 feet) locally.

Qs sandy gravel with scattered cobbles is generally non-cohesive and loosens easily when excavated; therefore, following stripping, excavation, or grading to the required depth, the exposed surface should be compacted to achieve at least 95 percent of maximum dry density as determined by ASTM D 1557-70. Areas that are soft, loose, or yielding under the compaction process should be further compacted, removed and reconditioned, or replaced with compacted structural fill so that a dense and unyielding condition is achieved.

9.3 Foundation Design and Allowable Bearing Pressures

Based on the subsurface conditions encountered in the test pit explorations, it is our opinion that the building foundations could be supported on conventional spread footings bearing in medium dense to dense, undisturbed Recessional Outwash (Qvro and Qs) or densely compacted structural fill placed directly onto undisturbed Recessional Outwash. Refer to Table 1 for depth to bearing soils. The relative density of Recessional Outwash gravel described in the test pit excavations indicates medium dense, undisturbed soil is generally present 1.5 feet bgs.

Foundations bearing in undisturbed Recessional Outwash gravel could be designed for an allowable bearing pressure of up to 4,000 pounds per square foot (psf). Where densely compacted structural fill is placed over native, dense recessional outwash, an allowable bearing pressure of 4,000 psf could be used.

Given the anticipated variability of the foundation bearing materials (native soil, fill, and structural backfill) we recommend that the allowable bearing capacities be increased by one-third when used with alternative basic load combinations that include wind or earthquake loads. This recommendation is in accordance with the International Building Code (IBC) (2009) Section 1806.

9.4 Estimated Settlements

We estimate settlements to be less than ¾ inch, with differential settlements (between adjacent footings or over a 20-foot-long span of continuous footing) less than ½ inch, provided footings are designed and constructed in accordance with our recommendations. These settlements are expected to occur essentially as the structural loads are applied due to the granular nature of the soil.

We estimate settlements at roadway embankments, sidewalks, utility installations, etc. to be less than ½ inch, provided subgrade materials and utility backfills are placed and compacted in accordance with the recommendations presented in this report. These settlements are expected to occur during and shortly following soil placement and compaction, due to the granular nature of the soil.

9.5 Lateral Earth Pressures

Lateral earth pressures act on the buried portions of the building walls. For buried building walls that are allowed to move at least 0.001 times the wall height, we recommend using a static, active lateral earth pressure equivalent to a fluid weight of 35 pounds per cubic foot (pcf) for

design. For buried walls that are not allowed to move 0.001 times the wall height (braced condition), a static, at-rest lateral earth pressure equivalent to 55 pcf should be used. If a slope will exist above the top of a retaining wall, 1 pcf should be added the design lateral earth pressure for each degree of slope inclination. These lateral earth pressures assume the wall backfill includes proper drainage so that hydrostatic pressures will not increase.

9.6 Lateral Resistance

Lateral forces would be resisted by passive earth pressure against the buried portions of the structures and friction against the bottom. In our opinion, passive earth pressures developed from compacted granular fill could be estimated using an equivalent fluid unit weight of 350 pcf. This value is based on the assumption that the structures extend at least 1.5 feet below the lowest adjacent exterior grade and are properly drained, and that the backfill around the structure is compacted in accordance with the recommendations for structural fill outlined herein. The above equivalent fluid unit weight includes an FS of 1.5 to limit lateral deflection.

9.7 Base Footing Friction

We recommend that a coefficient of friction of 0.40 be used between foundation cast-in-place concrete and undisturbed Recessional Outwash soil. A coefficient of friction of 0.35 should be used for footings bearing on compacted structural fill. These values include an FS of 1.5.

9.8 Seismic Criteria

The seismic design for the buildings will be in accordance with IBC 2009. Computation of forces used for seismic design for this code is based on seismological input and site soil response factors. Ground motions considered for evaluation using these guidelines are defined as motions with approximately 2 percent probability of exceedance in 50 years or about a 2,500-year return period.

Characterization of soil profile type is required in the IBC 2009 to determine the site class definition. Based on the dense nature of Recessional Outwash and soil classifications derived from the explorations completed at the site, it is our opinion that Site Class D, in accordance with the criteria in IBC 2009, adequately characterizes the subsurface conditions at the sites.

The seismological inputs are short-period spectral acceleration (S_s) and spectral acceleration at 1-second period (S_1) taken from approved National Earthquake Hazards Reduction Program spectral response acceleration contour map for Class B sites. Sites classified as Class B are

defined as firm rock having a shear-wave velocity between 2,500 and 5,000 feet per second in the top 100 feet. The mapped S_s and S_1 values in the vicinity of the project are 1.18g and 0.41g, respectively.

In accordance with IBC 2009, the site coefficients F_a and F_v, corresponding to Site Class D and the appropriate spectral acceleration values, are 1.03 and 1.59, respectively.

9.9 Floor Slabs

We recommend that floor slabs be supported by dense, native soil or compacted structural fill placed directly onto dense, native soil. If fill as described herein or unanticipated loose, soft, or unsuitable soil is encountered, it should be removed and replaced with compacted structural fill. Structural fill should be compacted to a dense, unyielding condition according to our recommendations presented in Section 9.12.2, Fill Placement, Compaction, and Use of On-site Soils. A modulus of subgrade reaction of 300 pounds per cubic inch may be used to design the slab, assuming dense structural fill or native subgrades will be present.

We recommend placing a capillary break consisting of a minimum 4-inch layer of washed pea gravel (⅜-inch to No. 8 sieve size), or ⅝-inch-minus crushed rock and a vapor retarder consisting of 10-mil plastic sheeting, as shown in Figure 3.

9.10 Subdrainage and Surface Water Drainage Control

We recommend installing a subdrain system along the outside of the perimeter footings to prevent the buildup of hydrostatic pressures. The subdrain system should consist of a perforated or slotted, 4-inch (minimum)-diameter plastic pipe bedded in ⅜-inch to No. 8 size washed pea gravel. Please refer to Figure 3 for typical wall subdrainage and backfilling recommendations. A perimeter subdrain is not necessary around shallow (less than approximately 3 feet deep) continuous wall footings. Where deeper installations are needed (elevator pits and mechanical room), potential groundwater could be controlled using a sump pump connected into the storm drainage system.

Where a perforated or slotted drain pipe from a subdrain system connects into a tightline, we recommend that a low-permeability concrete collar or dam be placed along the first 2 feet of the tightline to force all water into the tightline. Cleanouts should be provided at convenient locations along all drain lines, such as at the building corners.

To promote surface water drainage, provisions should be made to direct it away from structures and to prevent water from seeping into the ground adjacent to the structures. Ground surface should be sloped away and surface and downspout water should not be introduced into site backfill. Surface water should be collected in catch basins and, along with downspout water, be conveyed in a nonperforated pipe (tightline) to an approved discharge point.

9.11 Traffic Signal Standard Foundations

Three soil borings, designated B-1 through B-3, were drilled near the Pendleton Avenue and 2nd Division Drive, 3rd Division Drive, and 4th Division Drive intersections, respectively, to a depth of 26.5 feet. Generally, the soil encountered at each boring is similar. Soils consisted of medium dense to dense, brown and gray, sandy gravel with trace silt and local layers of medium stiff to stiff, silty clay. Layers of gravelly sand and fine gravel with cobbles that cave easily should be anticipated. Moist to wet conditions were observed in samples between 15 and 30 feet deep. The borings are designated B-1 through B-3. The approximate locations are shown in the Site and Exploration Plan, Figure 2.

We understand the traffic signal standards design will be in accordance with methods developed by the Washington State Department of Transportation (WSDOT, 2009). Standard foundations are designed based on a correlation of allowable lateral bearing pressures with Standard Penetration Test (SPT) values (N-values) and soil type. Our recommendations assume that WSDOT 2009 Standard Plans are used for design and construction. The recommended allowable bearing pressures were estimated based on SPT N-values from borings drilled within 20 feet of the intersections. Generally, N-values from driven samples 2.5 to 10 feet deep from borings B-1 and B-3 are between 20 and 30 and 5 to 30 feet in boring B-2. Based on Table 17-2, "Design parameter correlations for the design of signal, signs, sign bridge and luminaire foundations," included in the WSDOT Geotechnical Design Manual M 46-03, a lateral bearing pressure of 3,500 psf is recommended for the design of signal standard foundations at borings B-1 and B-3, and 12,000 psf at boring B-2.

Our recommendations assume that signal standard foundations using WSDOT Standard Plan J-28.30-00 will not be constructed on or immediately adjacent to slopes steeper than 1 Horizontal to 1 Vertical (1.5H:1V). For pole foundations where slopes exist, the Standard Plan foundation depths should be modified as follows:

- For slopes 3H:1V or flatter, use the standard foundation depth.

- For slopes 2H:1V or flatter, add 0.5B to the depth (where B is the width or diameter of the foundation.
- For slopes 1.5H:1V or flatter, add 1.0B to the depth.

Signal standard foundations should not be placed on or within 1.0B of the shoulder of slopes steeper than 1.5H:1V.

9.12 Pavement Design Recommendations

9.12.1 General

We understand that the pavement work on the Barracks FY 11 PN064457 project comprises flexible or hot-mix asphalt (HMA) pavements along Pendleton Avenue between 2nd Division Drive and 3rd Division Drive, and along 2nd Division Drive and 3rd Division Drive between Pendleton Avenue and Bennett Avenue. We understand that Portland cement concrete (PCC) pavement is an alternative pavement at Pendleton Avenue/2nd Division Drive, and Pendleton Avenue/3rd Division Drive intersections. The pavement work also includes HMA pavement for privately owned vehicles (POV) parking area. Figure 2 shows the above described proposed pavement areas. We understand that pervious pavement alternative may be considered for the parking lots, since pervious paving could be utilized in low volume/low speed traffic areas because of its lower load-bearing capacity.

We used the layered elastic design (LED) approach as outlined in the Army Technical Manual TM 5-822-13, "Pavement Design For Roads, Streets, and Open Storage Areas, Elastic Layered Method" (1994) to estimate the pavement section thickness. The basic principle for the LED design procedure is to select a pavement thickness required to limit the vertical strains in the subgrade, and the horizontal strains at the bottom of the bituminous concrete or the HMA induced by design vehicular traffic loads at select traffic levels, and to limit the tensile stresses in the PCC to levels that are sufficiently below the flexural strength of the concrete such that failure occurs only after the pavement has sustained a number of load repetitions. The purpose is to prevent shear failure in the subgrade and cracking in the HMA or PCC layer. The strains used for entering the criteria are computed by the use of Burmister's solution for multilayered elastic continua. The solution of Burmister's equations for most pavement systems will require the use of computer programs and the characterization of the pavement materials by the modulus of elasticity and Poisson's ratio. We used the program PCASE (U.S. Army Corps of Engineers, 2005), which utilizes the LED method.

Pervious pavements are considered as infiltration systems, and are part of the stormwater management of the project. Pervious pavements save open space by reducing stormwater runoff volume, rate and pollutants, as well as eliminate the cost of piping stormwater to an outfall. Also, they provide a reservoir and percolation field for surface water to re-enter ground aquifers. In our pervious pavement recommendations, we followed best management practice guidelines of Pennsylvania Stormwater Management Manual, which are adopted by the City of Seattle Park Department. We also considered recommendations for pervious pavement in U.S. Environmental Protection Agency and Federal Highway Association online publications.

9.12.2 Vehicle and Traffic Information

Berger ABAM provided us with the Transportation Operations Report prepared by DKS Associates dated September 2010. The report included daily traffic volumes and considered both eastbound and westbound traffic on Pendleton Avenue at different segments of the roadway including that between 2nd and 3rd Division Drives. The study considered both northbound and southbound traffic on 2nd Division Drive and 3rd Division Drive. The study included a vehicle classification count using the 13-bin system used by Federal Highway Administration and the WSDOT Pavement Guide Interactive (WSDOT, 2003).

In order to convert a mixed traffic stream into equivalent single axle loads (ESALs), we used the load equivalency factor values recommended by WSDOT (WSDOT, 2003) Section 3.6.2 for each vehicle class included in the traffic study. We considered a pavement design life of 20 years and a growth rate of 3.5 percent as recommended in the Traffic Operations Report. We did not have detailed information of the "Not Classed" category so we assumed that 10 percent of this category consists of truck traffic. We estimated the design ESALs by multiplying the daily ESAL by 365 days per year and then by the traffic growth factor. We estimated the design ESALs to be 2.6, 0.75, and 0.68 million on Pendleton Avenue, 3rd Division Drive, and 2nd Division Drive, respectively. We understand that 3rd Division Drive will receive occasional stryker vehicle traffic and therefore we assumed a total design ESAL's of 1 million on 3rd Division Drive. For the POV parking lot, we assumed a design ESALs of 10,000 consisting with the intent traffic loading.

9.12.3 Subgrade Condition

We used the subsurface conditions encountered in the test pits that were excavated on the project site to estimate the California Bearing Ratio (CBR) and Resilient Modulus (M_R) used in the pavement design. The test pits reached a depth ranging from 5 to 10 feet bgs. Subsurface

conditions based on the test pits were almost consistent throughout the site. A medium dense to dense, sandy gravel layer was encountered underlying the topsoil and extended to the bottom of the test pits. Based on published correlation of the encountered subgrade soil and CBR and M_R, we recommend assuming a CBR of 20 percent and an M_R of 17 kips per square inch.

9.12.1 Conventional Pavement Section Recommendations

9.12.1.1 Hot-mix Asphalt (HMA) Pavement Section Recommendations

The following table presents our assumptions for designing HMA pavement in accordance with the LED method:

INPUT DATA FOR PAVEMENT ANALYSIS

Parameter	Value
Design life	20 years
Design traffic load	
Pendleton Avenue	2,600,000 ESALs
3rd Division Drive	1,000,000 ESALs
2nd Division Drive	680,000 ESALs
POV Parking Lot	10,000 ESALs
Resilient Modulus, M_R	
HMA	450 ksi
Base course	30 ksi
Subgrade	17 ksi
Poisson's Ratio	
HMA	0.30
Base course	0.35
Subgrade	0.40

Notes:
ESALs = equivalent single axle loads
HMA = hot-mix asphalt
ksi = kips per square inch
POV = privately owned vehicles

For the above design assumptions, we recommend a minimum HMA pavement section as follows:

Pendleton Avenue

5 inches: Asphalt Pavement, HMA Class ½ inch
6 inches: Crushed Surfacing Base Course (CSBC)

3rd Division Drive

4 inches: HMA Class ½ inch
6 inches: CSBC

2nd Division Drive

We understand that it is expected that 2nd Division Drive will carry similar traffic loads as currently on 3rd Division Drive. Therefore, we recommend the same pavement section to 3rd Division Drive.

4 inches: HMA Class ½ inch
6 inches: CSBC

POV Parking Lot

2.5 inches: HMA Class ½ inch
4 inches: CSBC

9.12.1.2 Portland Cement Concrete (PCC) Pavement Section Recommendations

The following table presents our assumptions for designing PCC pavement in accordance with the LED method:

INPUT DATA FOR PAVEMENT ANALYSIS

Parameter	Value
Design life	20 years
Design traffic load	2,600,000 ESALs
Modulus (ksi)	
Concrete	4,000
Base Course Resilient Modulus, MR	30
Subgrade Resilient Modulus, MR	17
Poisson's Ratio	
Concrete	0.15
Base Course	0.35
Subgrade	0.40

Notes:
ESALs = equivalent single axle loads
ksi = kips per square inch

For the above design assumptions, we recommend a minimum PCC pavement section as follows:

Pendleton Avenue

7 inches: PCC
6 inches: CSBC

9.12.1 Pervious Pavement Section Recommendations

Pervious pavements are considered as infiltration systems, and are part of the stormwater management of the project. The pervious pavement section presented herein should be checked for its hydraulic adequacy to serve its intended use.

The pervious pavement consists of porous asphalt overlying a stone bed. Stormwater drains through the surface, is temporarily held in the voids of the stone bed, and then slowly percolates into the underlying, uncompacted subgrade. The stone bed may be designed with an overflow control structure so that during large storm events peak rates are controlled and at no time does the water level rise to the pavement level. A layer of nonwoven geotextile filter fabric separates the stone bed from the underlying subgrade, preventing the migration of fines into it. The bed bottoms should be level and uncompacted. If new fill is required, it should consist of additional stone and not compacted soil. Based on the above design considerations, we recommend a minimum pervious pavement section as follows:

2.0 inches: Porous HMA
1.0 inch: Choker course
12.0 inches: Stone bed
Nonwoven geotextile filter fabric

9.12.2 Pavement Materials and Construction Considerations

9.12.2.1 Conventional Pavement

Aggregate base course, HMA, and PCC pavements should be constructed in accordance with WSDOT and American Public Works Association (APWA), Standard Specifications for Road, Bridge, and Municipal Construction (WSDOT/APWA Standard Specifications, 2010). HMA and PCC should conform to Sections 5-04, and 5-05 in the WSDOT/APWA Standard Specifications, respectively.

Aggregate for PCC and HMA should meet the requirements of Sections 9-03.1 and 9-03.8, respectively. HMA should consist of HMA Class ½-inch aggregate in accordance with Section 9-03.8(2). Base course should meet the requirements of WSDOT Standard Specifications Section 9-03.9(3) for crushed surfacing base course. The base course should be compacted to at least 95 percent of the Modified Proctor maximum dry density (ASTM D 1557)

Prior to placing the base course, topsoil should be removed until gravel subgrade is exposed. The subgrade should be graded to its design grade, smoothed, and compacted to at least 95 percent of the Modified Proctor maximum dry density (ASTM D 1557). The base course should be proof rolled with a loaded dump truck (or equivalent) to check for yielding conditions. Any yielding areas should be suitably replaced. Soft, loose, wet, or otherwise yielding material should be removed and replaced.

9.12.2.1 Pervious Pavement

We recommend the following material specifications for pervious pavement:

- **Porous Bituminous Asphalt.** The bituminous surface course shall be 4 - inches thick with a bituminous mix of 6 percent by weight dry aggregate. Porous asphalt uses the same mixing and application equipment as for conventional asphalt. A neat asphalt binder modified with an elastomeric polymer is recommended. The polymer modified asphalt binder shall be heat and storage stable. Aggregate shall be minimum 90 percent crushed material and have a recommended gradation of:

  U.S. Standard Sieve Size Percent Passing
  ½ (12.5 millimeter [mm]) 100
  ⅜ (9.5 mm) 92 to 98
  4 (4.75 mm) 34 to 40
  8 (2.36 mm) 14 to 20
  16 (1.18 mm) 7 to 13
  30 (0.60 mm) 0 to 4
  200 (0.075 mm) 0 to 2

- **Stone.** Stone bed shall be 2.5-inch to 1.5-inch uniformly graded coarse aggregate, with a wash loss of no more than 0.5 percent, AASHTO size number 3 and shall have voids 40 percent as measured by ASTM-C29 (or equivalent). Choker base course aggregate for beds shall be ⅜ inch to ¾ inch uniformly graded coarse aggregate AASHTO size number 57 (or equivalent).

- **Nonwoven Geotextile**. The nonwoven geotextile filter fabric shall consist of needled nonwoven polypropylene fibers and meet the following properties:

a. Grab Tensile Strength (ASTM D 4632) ≥ 120 pounds
b. Mullen Burst Strength (ASTM D 3786) ≥ 225 psi
c. Flow Rate (ASTM D 4491) ≥ 95 gallons per minute per square foot
d. UV Resistance after 500 hrs (ASTM-D4355) ≥ 70 percent

Heat-set or heat-calendared fabrics are not permitted. Geotextile and bed aggregate shall be placed immediately after approval of subgrade preparation. Geotextile is to be placed in accordance with manufacturer's standards and recommendations. Clean (washed) uniformly-graded stone is placed in the bed in maximum 8-inch lifts. Each layer shall be lightly compacted, with the construction equipment kept off the bed bottom as much as possible. Once bed aggregate is installed to the desired grade, a 1-inch layer of choker base course (AASHTO No. 57) aggregate shall be installed uniformly over the surface in order to provide an even surface for paving.

In our recommendations, we assumed that the pervious pavement will be constructed over the gravel layer that is encountered in the test pits about 0.5 to 2.5 feet below the ground surface. In our opinion, the gravel layer would meet the required minimum hydraulic conductivity of 0.5 inch/hour (3.5E-04 centimeters per second) for subgrade below the stone bed. The bottom of the stone bed should maintain a buffer of at least 3 feet above the high water table. Infiltration or grain size distribution tests may be performed for the upper sandy silt/silty sand layer to assess its suitability as a subgrade soil for the pervious pavement system. A pilot infiltration test or other infiltration test is recommended in this gravel at each parking lot. The bottom of the stone bed should maintain a buffer of at least 3 feet above the high water table.

9.12.3 Frost Conditions

Frost-susceptible soil is generally regarded as having greater than 3 percent finer than 0.02 millimeter (mm). Soil with a fines content not exceeding 7 percent passing the No. 200 sieve, based on the minus ¾-inch fraction, can normally be expected to have 3 percent or less finer than 0.02 mm. Based on the grain size analyses presented in Attachment A and soil classification presented in the logs, in our opinion, most of the near-surface fill soils could be considered non-frost-susceptible. Based on information provided in the WSDOT Pavement Guide, we recommend assuming the frost depth would be about 12 inches. WSDOT recommends that the total pavement section be at least 50 percent of the frost depth. In our opinion, the recommended HMA Pavement Sections should provide adequate protection against potential frost heave damage.

9.12.4 Utility Considerations Under Pavement

All utility trenches should be backfilled with clean granular material, such as sand, sand and gravel, or crushed rock with a maximum 2-inch-diameter and with not more than 5 percent passing the No. 200 sieve (wet sieve analysis, ASTM D 1140). Any fines should be nonplastic. The backfill should be placed in lifts not exceeding 4 inches if compacted with hand-operated equipment or 8 inches if compacted with heavy equipment. Each lift should be compacted to a dense, unyielding condition and to at least 92 percent of the maximum dry density (ASTM D 1557) 18 inches or more below the pavement subgrade, and 95 percent within 18 inches of the pavement subgrade. We recommend a minimum cover over utilities of 2 feet from the crown of the pipes or conduits to the top of the pavement subgrade. This could vary depending on the utility type, size, and depth and should be evaluated by the design engineers. Catch basins, utility vaults, and other structures installed flush with the pavement should be designed and constructed to transfer wheel loads to the base of the structure.

9.12.5 Pavement Surface Drainage and Subdrainage

This section applies only to the conventional pavement. Excess water that accumulates in the CSBC and subgrade layers and does not drain quickly enough can reduce the pavement design life and weaken the subgrade support. Water in the pavement can be from surface infiltration through the pavement joints or cracks or from underneath the pavement due to high or perched groundwater table. Therefore, to enhance the pavement subdrainage, we recommend constructing drainage ditches or trench subdrains along the pavement edges. The drainage ditches or trench subdrains should be at least 18 inches deeper than the pavement subgrade surface. The pavement subgrade surface should be graded to drain toward the ditches. The pavement base course material should extend to daylight on the roadway slopes and into the drainage ditches to provide drainage continuity. Alternatively, if runoff is collected and pavement is sloped to drain toward curbs and gutters, then daylighting base material into ditches would not be necessary.

We recommend developing a routine maintenance program to seal the cracks that develop in the pavement to reduce stormwater infiltration through them. Surface water runoff from the pavement areas should be collected to reduce seepage into the pavement base and subgrade. Unpaved areas adjacent to the pavements should be graded to direct surface runoff away from the pavements.

9.12.6 Construction and Maintenance Considerations for Pervious Pavement

Pervious pavement is susceptible to damage and malfunction during construction and, therefore, we recommend that the construction be undertaken in such as way as to prevent:

- **Compaction of subgrade:** The existing subgrade under the bed areas shall not be compacted or subject to excessive construction equipment traffic prior to geotextile and stone bed placement.
- **Contamination of stone bed material with sediment and fines**: Control of sediment is critical and rigorous installation and maintenance of erosion and sediment control measures is required to prevent sediment deposition on the pavement surface or within the stone bed. Nonwoven geotextile may be folded over the edge of the pavement until the site is stabilized. Surface sediment shall be removed by a vacuum sweeper and shall not be power-washed into the bed.
- **Drainage of sediment laden waters onto pervious surface or into constructed bed:** Infiltration beds should be constructed on flat grades to prevent stormwater from ponding. Infiltration beds may be placed on a slope by benching or terracing parking bays. Orienting parking bays along existing contours will reduce site disturbance and cut/fill requirements.

Staging, construction practices, and erosion and sediment control must all be taken into consideration when using pervious pavements. Due to the nature of construction sites, pervious pavement and other infiltration measures should by installed toward the end of the construction period, if possible.

All pervious pavement installations must have a backup method for water to enter the stone storage bed in the event that the pavement fails or is altered. In uncurbed lots, this backup drainage may consist of an unpaved 2-foot-wide stone edge drain connected directly to the bed between the wheel stop. In curbed lots, inlets with 12-inch sediment traps may be required at low spots. Backup drainage elements will ensure the functionality of the infiltration system if the pervious pavement is compromised.

9.13 Earthwork

9.13.1 General

In our opinion, earthwork operations can be accomplished with conventional excavation equipment (hydraulic excavators, scrapers, road graders, etc.). Removal of a layer of sod and topsoil will be necessary prior to excavation or placement of soil. Refer to Section 9.2, Site

Preparation, for information regarding stripping depths and existing fill material. Following site preparation, earthwork operations can proceed.

Groundwater was not encountered in any of the test pit excavations.

9.13.2 Fill Placement, Compaction, and Use of On-site Material

Roadway embankments, sidewalks, utilities, etc., where fill soil is required to achieve grade, the soil exposed at the surface after stripping of topsoil and fill removal should be compacted using a self-propelled 10-ton smooth drum vibratory compactor. Following compaction, this surface should be proof-rolled with a loaded dump truck or equivalent to reveal possible loose, deflecting, or yielding conditions. These areas should be repaired prior to fill placement.

Soil classified on the test pit logs as fill and some Qvro is typically native material that may have been previously graded and locally contains a dark brown silt portion (GM). This material is suitable for use as fill provided the moisture content is within ±2 percent of optimum for compaction and abundant roots (greater than 10 percent) are removed. This material contains enough fine-grained material (silt) to become difficult or impossible to compact when wet or in wet weather and should not used in those conditions.

Qvro soil that is well graded and relatively clean with less than 5 percent fines is suitable for use as fill and could be used when wet or during wet weather. During dry conditions, Qvro should be moisture conditioned (water added) to achieve optimum moisture conditions for compaction. Cobbles (rocks greater than 3 inches) are contained within the recessional outwash encountered at the site. When these soils are used as fill, removal of the cobbles is not practical; however, they should be separated so concentrations of cobbles do not occur in local areas. Cobbles greater than 8 inches (recommended lift thickness) and all boulders should be removed and not used in fills.

Roadway embankment fill should be placed in uniform lifts and compacted to a dense and unyielding condition, to at least 95 percent of the Modified Proctor maximum dry density (ASTM D 1557-70). The thickness of soil layers before compaction should not exceed 8 inches for heavy equipment compactors or 4 inches for hand-operated mechanical compactors. In landscaped areas, the backfill should be compacted to at least 90 percent of the Modified Proctor maximum dry density.

9.13.3 Imported Structural Fill

Imported roadway fill soil should consist of a well-graded mixture of sand and gravel, free of organics, debris, and rubbish, and should contain not more than 20 percent fines (material passing the No. 200 mesh sieve, based on the minus ¾-inch fraction). The fines should be nonplastic and the moisture content of the soil should be within ±2 percent of optimum. All import structural fill should have a maximum particle size of 3 inches.

During wet weather or in wet conditions where control of soil moisture is difficult, import structural fill material should consist of clean, granular soil, of which not more than 5 percent by dry weight passes the No. 200 mesh sieve, based on wet-sieving the fraction passing the ¾-inch sieve. The fines should be nonplastic. The native, recessional outwash soil is suitable for use as structural fill during wet weather, provided all organic material is removed.

9.13.4 Temporary and Permanent Excavation Slopes

Temporary excavation slopes should be made the responsibility of the Contractor who is continually at the site; is able to observe the nature and conditions of the subsurface materials encountered, including groundwater; and has responsibility for the methods, sequence, and schedule of construction.

For planning purposes, we recommend that temporary, unsupported, open-cut slopes be no steeper than 1H:1V in the very dense native soil (recessional outwash). For slopes cut in fill or loose surficial soils, we recommend they be made no steeper than 1.5H:1V. These recommendations apply to slopes in areas where groundwater and/or groundwater seepage is not present. Flatter slopes may be required based on the actual conditions encountered, particularly where groundwater or seepage is present during periods of wet weather. We recommend that all exposed slopes be protected with plastic sheeting during periods of wet weather to reduce sloughing and erosion.

Where permanent excavations are planned, we recommend that slopes be no steeper than 2H:1V in order to reduce surface sloughing and erosion. Permanent slopes should be protected from erosion by seeding and planting and, depending on the time of year, covered with plastic sheeting or erosion control matting. To promote surface water drainage, we recommend that the ground surface be sloped to drain away from the top of permanent slopes.

9.14 Groundwater Control

Groundwater was encountered during drilling of boring B-1 at a depth of approximately 16 feet bgs, but was not encountered during drilling of B-2 and B-3 or during test pit excavation. Groundwater is not anticipated during excavations, but if groundwater is encountered, sumps and pumps can likely remove accumulations and flows of groundwater into open excavations installed in the bottom of the excavations.

10.0 CONSTRUCTION CONSIDERATIONS

10.1 Obstructions

Unanticipated conditions are commonly encountered and cannot be fully determined by merely taking soil samples or making explorations. Cobbles were observed in the test pit excavations. Cobbles and boulders (rocks greater than 12 inches) should be anticipated during excavation. These obstructions could impact excavations.

Several evergreen trees and barracks and other structures have been or are scheduled to be cleared from the site along the proposed alignment of the newly constructed, reconstructed, and extended roadways. Subsurface obstructions in these areas could include large tree roots, concrete slabs or other foundation elements, buried utility lines, and scattered deleterious materials such as bricks and piping.

10.2 Drilled Shaft Construction

Construction of a drilled shaft requires boring a hole of a specified diameter and depth and then backfilling the hole with reinforced concrete. Selection of equipment and procedures for constructing drilled shafts are a function of the shaft dimensions, the foundation conditions, and the groundwater characteristics. Consequently, the design and performance of a drilled shaft can be influenced by the equipment and construction procedures used to install the shafts.

Drilled shaft contractors who participate in this project should be required to demonstrate that they have suitable equipment and at least five years of experience in the construction drilled shaft foundations.

10.2.1 Methods of Construction

In general, there are two typical methods of installing drilled shafts for soil conditions at this site: the dry method and the casing method, as described in the following sections.

10.2.1.1 Dry Method

In the dry method of construction, the excavation is normally carried to its full depth without casing through dry, dense sand and gravel where groundwater is not encountered. Following cleanout and inspection, concrete is placed through a drop chute to minimize segregation. The dry method of construction would generally be applicable for this project except where groundwater and caving soils are encountered.

10.2.1.2 Casing Method

The casing method is applicable where seepage or caving soil conditions are encountered and a casing can be pushed, driven, or twisted into an impermeable, firm stratum below the caving soil. The hole is generally drilled as in the dry method until caving, squeezing soil, or excessive seepage is encountered. Groundwater was encountered at 17 feet in borings B-2 and B-3. Water or polymers are placed in the hole and mixed with wet soil to develop slurry. Drilling then continues until an impermeable layer is encountered. The top of the slurry must be maintained above the groundwater level. Casing may then be placed into an impermeable layer to form a seal. The slurry may be bailed out with a cleanout or mud bucket and drilling may proceed in the dry. The impermeable firm stratum must have sufficient thickness to resist hydrostatic pressures below this zone when the shaft is dewatered.

If the soil profile is such that only a thin zone of caving soil exists within the shaft excavation, it may be possible to eliminate the use of the slurry. For this situation, the casing should be placed into the hole as soon as the caving material is encountered. The casing is then pushed, twisted, or oscillated through the caving zone into an impermeable soil layer below. Excavation may be continued in the dry.

Upon completion of the shaft excavation, the hole is cleaned and the reinforcing steel is installed. After the reinforcing steel is placed, the hole should be filled with concrete. Under no circumstances should the casing be withdrawn until the concrete produces a hydrostatic pressure greater than the groundwater and/or slurry that is sealed by the casing. The casing should be pulled slowly and smoothly so that the concrete flows out of the base of the casing to displace the trapped slurry. All voids or annular spaces that may exist between the casing and the subsurface materials should be filled with concrete during this process.

Improper casing extraction could result in an unacceptable drilled shaft. Casing may tend to adhere to the subsurface soils. Attempts to knock the casing loose take time and may allow the concrete placed in the shaft to set. The concrete may then separate when the casing is pulled, resulting in voids in the shaft. Therefore, the casing should be left in place if the concrete appears to be setting up and extraction becomes difficult. When this situation occurs, frictional resistance would be altered and the load-carrying capacity of the shaft should be reevaluated.

The presence of "running" or "caving" formations will require close monitoring of the concrete level during casing extraction. Failure to maintain a positive head of concrete during casing extraction could result in a contaminated mix or presence of voids in the shaft.

10.2.2 Drilled Shaft Considerations

It is our opinion that installation of drilled shafts at the project site could generally proceed using the dry and casing methods of construction. Past experience warns that at similar sites, cobbles and possibly boulders could be encountered in outwash deposits. The potential of encountering obstructions during drilled shaft installation should be included in the project specifications. In addition, the potential for soil caving is high and likely to require temporary casing to advance the borehole.

10.2.3 Monitoring Drilled Shaft Installation

An experienced and qualified geotechnical engineer familiar with the subsurface conditions of the project site should monitor installation of drilled shafts. The geotechnical engineer would perform inspection and identification of soil retrieved from auger flights to confirm that the subsurface conditions assumed for design are actually present. In addition to a description of the subsurface conditions encountered, the excavation methods, volume of soil removed, steel reinforcing and concrete placement operations, and casing extraction procedures should be observed and documented.

10.3 Footings

The recommended allowable bearing capacities are contingent upon the following construction considerations:

- Footing subgrade consisting of existing fill or newly placed fill compacted as recommended. Excavations made for spread footing foundations should be cleaned of all debris and loose, soft, wet, or disturbed soil prior to placement of the reinforced concrete.
- All excavations for spread footing foundations should be observed by a geotechnical engineer from our firm to evaluate the adequacy of the bearing stratum and to confirm that subsurface conditions at and below the bearing elevation are suitable for the design bearing values provided.

10.4 Loose Test Pit Backfill

Test pits dug for the explorations were loosely backfilled. The test pit excavations were made 5 to 10 feet deep and within the proposed project area. During construction, test pit areas should be located and the loose soil should be removed and appropriately backfilled with compacted structural fill. Test pit locations are shown in Figure 2.

10.5 Erosion Control

The Contractor should employ proper erosion control measures during construction, especially if construction takes place during wet weather. Work areas, soil stockpiles, or slopes should be covered with plastic sheeting held down with sandbags; sumps used to remove accumulations of rainwater; and other measures employed as necessary to permit proper completion of the work. Bales of straw, geotextile silt fences, and drain inlet sediment screens/collection systems should be appropriately located to control sediment movement and soil erosion.

10.6 Wet Weather Earthwork

Wet weather generally begins about mid-October and continues through about May, although rainy periods may occur at any time of year. Some of the soil at the site contains sufficient silts and fines to produce an unstable mixture when wet. Such soils are susceptible to changes in water content and they tend to become unstable and difficult or impossible to compact if their moisture content significantly exceeds the optimum. If earthwork at the site continues into the wet season, or if wet conditions are encountered, we recommend the following:

- The ground surface in and surrounding the construction area should be sloped as much as possible to promote runoff of precipitation away from work areas and to prevent ponding of water.

- Fill material should consist of clean, well-graded, pit-run sand and gravel soils, of which not more than 5 percent fines by dry weight passes the No. 200 mesh sieve, based on wet-sieving the fraction passing the ¾-inch mesh sieve. The gravel content should range from between 20 to 60 percent retained on a No. 4 mesh sieve. The fines should be nonplastic.
- No soil should be left uncompacted and exposed to moisture. A smooth-drum vibratory roller, or equivalent, should roll the surface to seal out as much water as possible.
- In-place soils or fill soils that become wet and unstable and/or too wet to suitably compact should be removed and replaced with clean, granular soil.
- Excavation and placement of structural fill material should be observed on a full-time basis by a geotechnical engineer (or representative) experienced in earthwork to determine that all work is being accomplished in accordance with the project specifications and our recommendations.
- Grading and earthwork should not be accomplished during periods of heavy, continuous rainfall.

We suggest that these recommendations for wet weather earthwork be included in the contract specifications.

10.7 Additional Services

We recommend that Shannon & Wilson be retained to review the geotechnical aspects of plans and specifications to determine that they are consistent with our recommendations. In addition, we should be retained to observe the geotechnical aspects of construction, particularly foundation installation, drainage and backfill, and pavement subgrade preparation. Observation will allow us to evaluate the subsurface conditions as they are exposed during construction and to determine that the work is accomplished in accordance with our recommendations and the project specifications.

11.0 LIMITATIONS

This report was prepared for the exclusive use of Berger ABAM for specific application to design of facilities discussed in this report. The report is provided for information of factual data only and not as a warranty of subsurface conditions such as those interpreted from the exploration logs and discussions of subsurface conditions included in this report.

The analyses, conclusions, and recommendations contained in this report are based on site conditions as they presently exist. We assume that the results of the exploratory borings and test pits made for this project represent the subsurface conditions throughout the sites; i.e., the subsurface conditions everywhere are not significantly different from those disclosed by the explorations. If conditions different from those described in this report are observed or appear to be present during construction, we should be advised at once so that we can review these conditions and reconsider our recommendations, where necessary. If there is a substantial lapse of time between submission of our report and the start of work at the site, or if conditions have changed due to natural causes or construction operations at or near the site, it is recommended that this report be reviewed to determine the applicability of the conclusions and recommendations considering the changed conditions and time lapse.

Within the limitations of the scope, schedule, and budget, the analyses, conclusions, and recommendations presented in this report were prepared in accordance with generally accepted professional geotechnical engineering principles and practice in this area at the time this report was prepared. We make no other warranty, either express or implied.

Unanticipated soil conditions are commonly encountered and cannot be fully determined by merely taking soil samples or completing test pit excavations. Such unexpected conditions frequently require that additional expenditures be made to attain a properly constructed project. Therefore, some contingency fund is recommended to accommodate such potential extra costs.

The scope of our services for this report did not include any evaluation regarding the presence or absence of wetlands. Nor were assessments or evaluations regarding the presence or absence of hazardous or toxic substances in the soil, groundwater, or air, on or below this site in our scope of work.

SHANNON & WILSON, INC.

Shannon & Wilson, Inc. has prepared a document, "Important Information About Your Geotechnical Report" (Attachment C), to assist you and others in understanding the use and limitations of our reports.

SHANNON & WILSON, INC.

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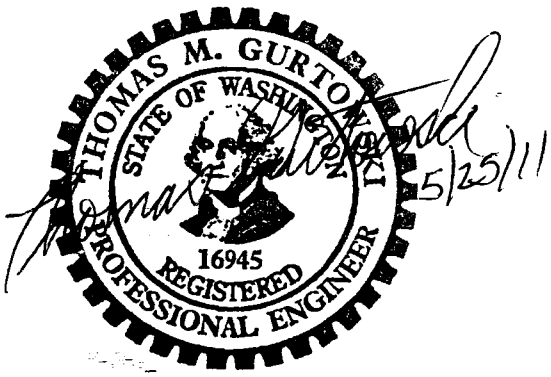
Erik D. Blumhagen
Hydrogeologist



Thomas M. Gurtowski, P.E.
Vice President

KTB:HKW:GSE:EDB:TMG:KTB/hkw

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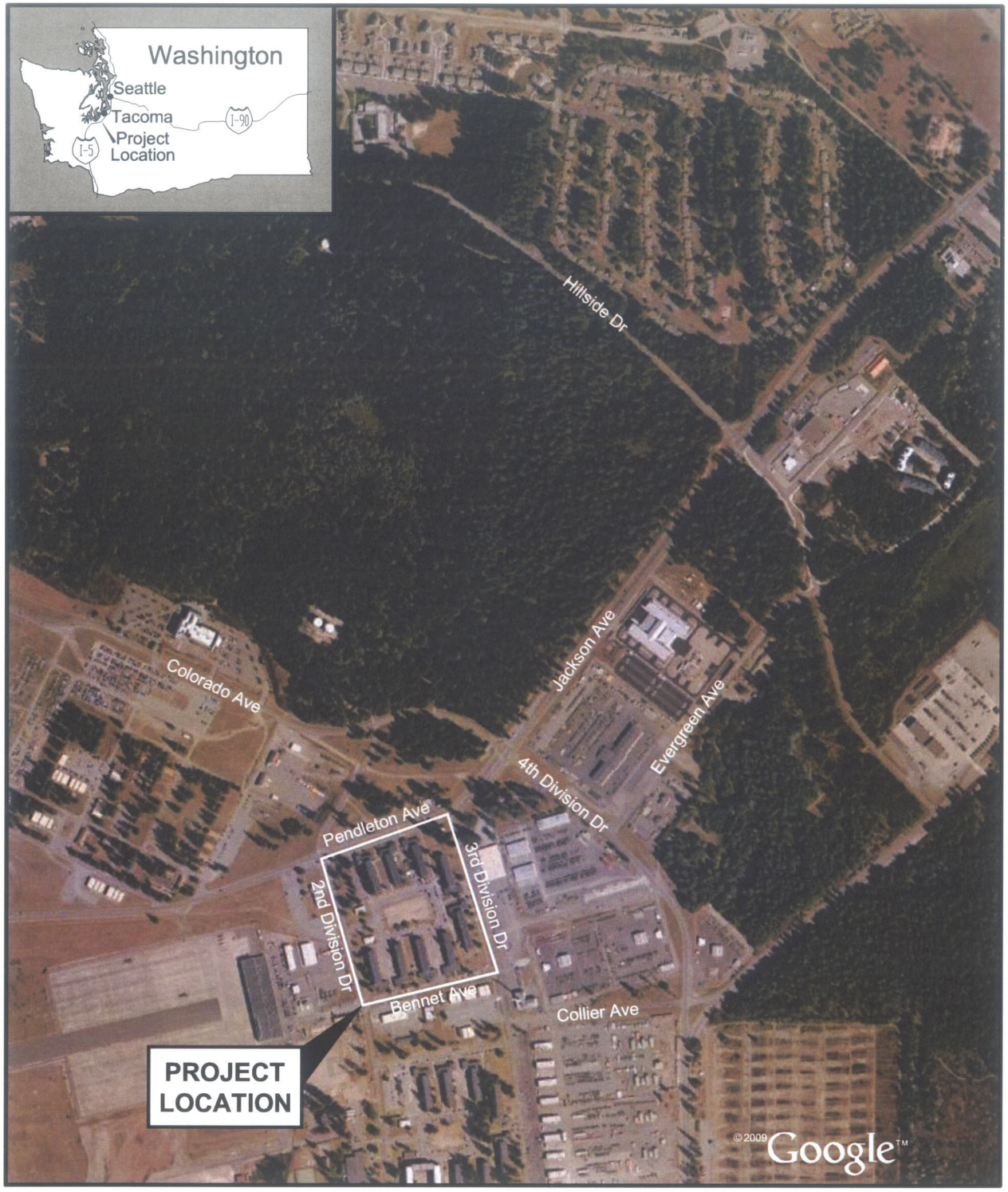

0 1000 2000

Approximate Scale in Feet

NOTE

Map adapted from aerial imagery provided by Google Earth Pro, copyright 2010 Europa Technologies, reproduced by permission granted by Google Earth ™ Mapping Service.

Pendleton Barracks
Joint Base Lewis-McChord, Washington

VICINITY MAP

January 2011 21-1-21368-003

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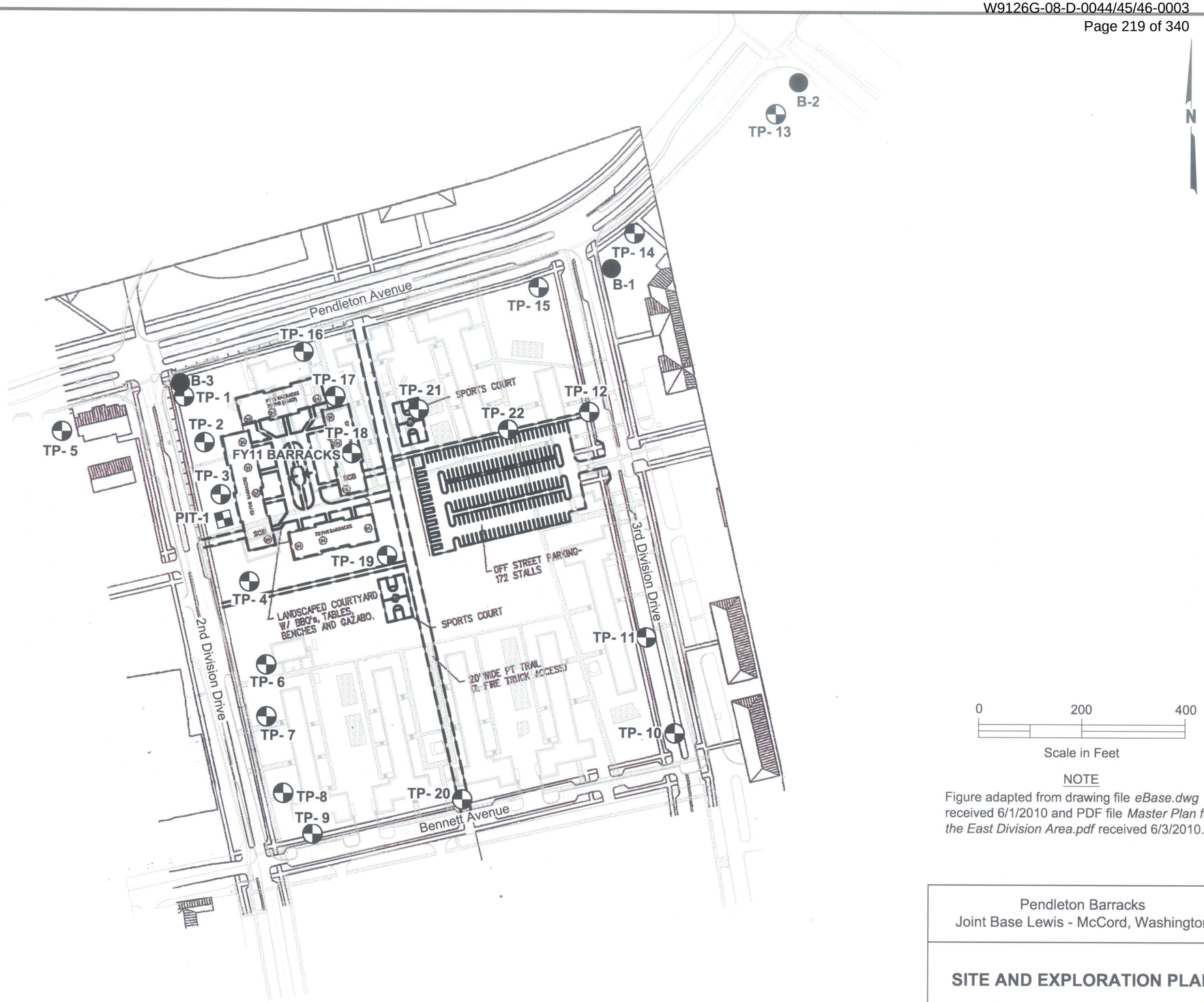
FIG. 1

Filename: J:\211\21368-003\21-1-21368-003 Fig 1.dwg Date: 05-25-2011 Login: lr



0 200 400

Scale in Feet

NOTE

Figure adapted from drawing file *eBase.dwg* received 6/1/2010 and PDF file *Master Plan for the East Division Area.pdf* received 6/3/2010.

LEGEND

B-1 Boring Designation and Approximate Location

TP-1 Test Pit Designation and Approximate Location

PIT-1 Pilot Infiltration Test Location (PIT)

Pendleton Barracks
Joint Base Lewis - McCord, Washington

SITE AND EXPLORATION PLAN

January 2011 21-1-21368-003

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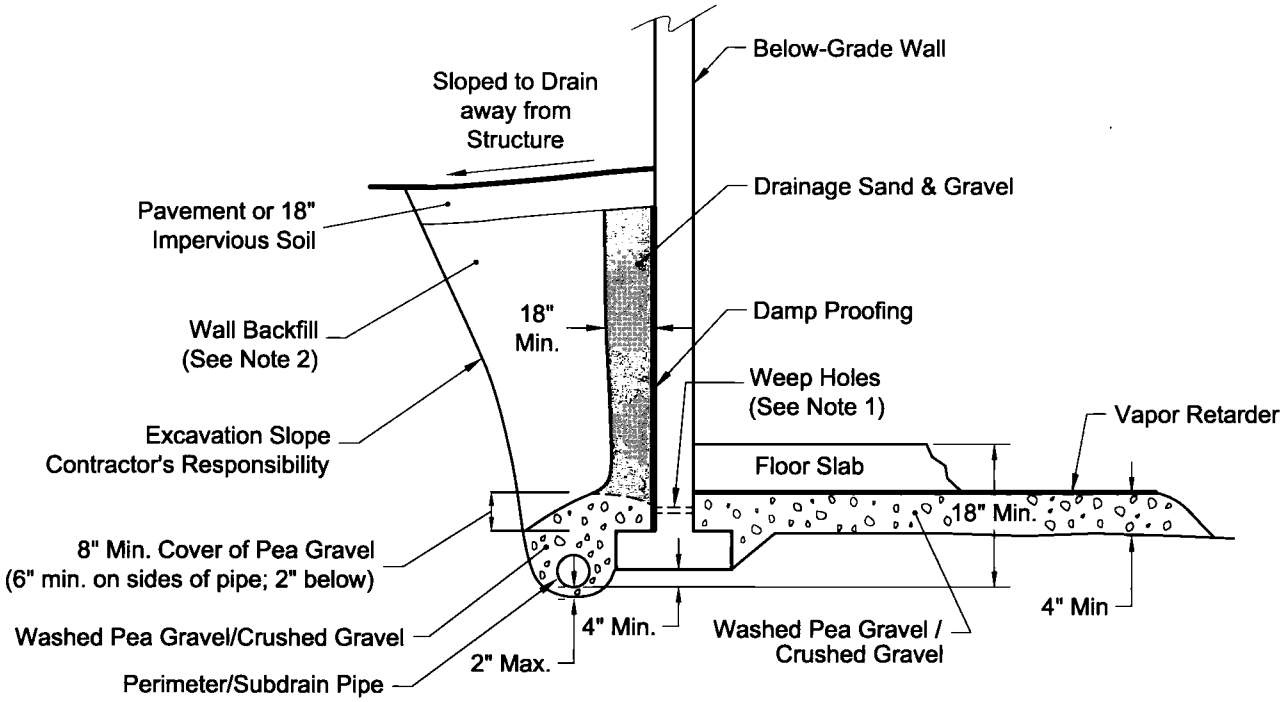
FIG. 2

Filename: J:\211\21368-003\21-1-21368-003 Fig 2.dwg Date: 01-14-2011 Login: bac



Not to Scale

NOTES

1. Washed pea gravel / crushed rock beneath floor slab could be hydraulically connected to perimeter/subdrain pipe. Use of 1" diameter weep holes as shown is one applicable method. Crushed gravel should consist of 3/4" minus. Washed pea gravel should consist of 3/8" to No. 8 standard sieve.
2. Wall backfill should meet WSDOT Gravel Backfill for Walls Specification 9-03-12(2).
3. Drainage sand and gravel backfill within 18" of wall should be compacted with hand-operated equipment. Heavy equipment should not be used to compact backfill, as such equipment operated near the wall could increase lateral earth pressures and possibly damage the wall.
4. All wall backfill should be placed in layers not exceeding 4" loose thickness for light equipment and 8" for heavy equipment and should be densely compacted. Beneath paved or sidewalk areas, compact to at least 95% Modified Proctor maximum density (ASTM: D1557-70 Method C). In landscaping areas, compact to 90% minimum.
5. Drainage sand and gravel may be replaced with a geocomposite core sheet drain placed against the wall and connected to the subdrain pipe. The geocomposite core sheet should have a minimum transmissivity of 3.0 gallons/minute/foot when tested under a gradient of 1.0 according to ASTM D4716.
6. The subdrain should consist of 4" diameter (minimum), slotted or perforated plastic pipe meeting the requirements of AASHTO M 304; 1/8-inch maximum slot width; 3/16- to 3/8-inch perforated pipe holes in the lower half of pipe, with lower third segment unperforated for water flow; tight joints; sloped at a minimum of 6"/100' to drain; cleanouts to be provided at regular intervals.
7. Surround subdrain pipe with 8 inches (minimum) of washed pea gravel (2" below pipe) or 5/8" minus crushed gravel. Washed pea gravel to be graded from 3/8-inch to No. 8 standard sieve.
8. See text for floor slab subgrade preparation.

MATERIALS

- Drainage Sand & Gravel:

Sieve Size	% Passing by Weight
1-1/2"	100
3/4"	90 to 100
1/4"	75 to 100
No. 8	65 to 92
No. 30	20 to 65
No. 50	5 to 20
No. 100 (by wet sieving)	0 to 2 (non-plastic)

3/4"-Minus Crushed Gravel:

Sieve Size	% Passing by Weight
3/4"	100
1/2"	75 to 100
1/4"	0 to 25
No. 100 (by wet sieving)	0 to 2 (non-plastic)

Pendleton Barracks
Joint Base Lewis-McChord, Washington

TYPICAL WALL SUBDRAINAGE AND BACKFILLING

January 2011 21-1-21368-003

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FIG. 3

File: J:\211\21368-003\21-1-21368-003 Fig 3.dwg Date: 01-14-2011 Author: bac

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ATTACHMENT A

FIELD EXPLORATIONS

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ATTACHMENT A

FIELD EXPLORATIONS

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ATTACHMENT A

FIELD EXPLORATIONS

A.1 GENERAL

The field exploration program for the Pendleton Barracks FY 11 PN064457 project at Joint Base Lewis-McChord, Washington, consisted of excavating and sampling 22 test pits. The logs of the test pits are presented as Figures A-2 through A-23. Table A-1 presents a summary of soil types and depths shown in the test pit logs. Approximate locations of the exploration test pits are shown in Figure 2 in the main text of this report. A soil classification and log key is presented in Figure A-1 as a reference for symbols and information presented on the boring logs.

A.2 SOIL CLASSIFICATION

An engineer from Shannon & Wilson, Inc. was present during all explorations to retrieve representative soil samples for subsequent laboratory testing and to prepare descriptive field logs of the excavations. Soils were classified in general accordance with the ASTM International (ASTM) Designation: D 2488-93, Standard Recommended Practice for Description of Soils (Visual-Manual Procedure). The Unified Soil Classification System (USCS), as described in Figure A-1, was used to classify the soils encountered in the test pits and borings. The test pit logs in this report represent our interpretation of the contents of the field logs.

A.3 BORINGS

Three soil borings were drilled by Holocene Drilling using a Mobile B-61 modified track drill rig and a hollow-stem auger. The first two borings were completed on December 1, 2010, and the last boring was completed on December 6, 2010. Disturbed soil samples were retrieved from the borings at 2½-foot depth intervals to 20 feet and at 5-foot intervals thereafter. The boring logs are presented as Figures A-24 through A-26.

To obtain disturbed soil samples, Standard Penetration Tests (SPTs) were performed in general accordance with the ASTM Designation: D 1586, Test Method for Penetration Test and Split-Barrel Sampling of Soils (ASTM, 2009). The SPT consists of driving a 2-inch outside-diameter, split-spoon sampler a total distance of 18 inches below the bottom of the drilled hole with a 140-pound hammer falling 30 inches. The number of blows required to cause the last 12 inches of penetration is termed the Standard Penetration Resistance (N-value). When the resistance

exceeded 50 blows for 6 inches or less penetration, the test was terminated and the number of blows and the corresponding penetration were recorded. The Standard Penetration Resistance N-values are plotted on the boring logs presented in Figures A-24 through A-26.

A boring log is a written record of the subsurface conditions encountered. It graphically illustrates the geologic units (layers) encountered in the boring and the USCS symbol of each geologic layer. Other information shown in the boring log includes approximate depth of differing soil type contacts, laboratory-determined moisture content, a description of the groundwater level observations made during drilling, and types and depths of sampling.

A.4 TEST PIT EXCAVATIONS

The test pit excavations performed at the sites consisted of digging and sampling 22 test pits. The excavations were made using a backhoe on May 10 and 11, 2010. The test pits are designated TP-1 through TP-22. The test pits were dug at selected locations within the site where access was available. The test pits were dug to depths ranging from 5.0 to 10.0 feet. The test pit logs are presented as Figures A-2 through A-23.

A test pit log is a written record of the subsurface conditions encountered. It graphically illustrates the geologic units (layers) encountered in the test pit and the USCS symbol of each geologic layer and includes estimated density. Other information shown in the test pit logs includes a plot of soil sample depth and ground surface elevation.

A.5 REFERENCE

ASTM International (ASTM), 2009, Annual book of standards, Construction, v. 04.08, Soil and rock (I): D 420 – D 5611: West Conshohocken, Pa.

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ATTACHMENT B

GEOTECHNICAL LABORATORY TESTING PROCEDURES AND RESULTS

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ATTACHMENT B

GEOTECHNICAL LABORATORY TESTING PROCEDURES AND RESULTS

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FIGURES

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ATTACHMENT B

GEOTECHNICAL LABORATORY TESTING PROCEDURES AND RESULTS

B.1 INTRODUCTION

This attachment contains descriptions of the procedures and the results of laboratory tests performed on the soil samples obtained from the field exploration for the Pendleton Barracks FY11 PN064457 project in Joint Base Lewis-McChord, Washington. We tested the samples to evaluate the index properties of the soils at the project site.

The Shannon & Wilson, Inc. laboratory conducted the testing during May and June 2010. Laboratory testing consisted of visual classification, natural moisture content determination, and grain size analyses.

B.2 CLASSIFICATION

All soil samples were classified using the Unified Soil Classification System (USCS). A summary of this classification system is shown in Figure A-1 (Attachment A). Classification of the samples tested in the laboratory was based on ASTM International (ASTM) D 2487, Standard Test Method for Classification of Soil for Engineering Purposes. Samples not tested in the laboratory were classified based on ASTM D 2488, Standard Recommended Practice for Description of Soils (Visual-Manual Procedure).

B.3 WATER CONTENT DETERMINATION

Water content was determined on selected samples collected in general accordance with ASTM D 2216, Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock. The water content is shown graphically on the test pit logs in Attachment A.

B.4 GRAIN SIZE ANALYSIS

The grain size distribution of selected samples was determined in general accordance with ASTM D 422, Standard Test Method for Particle-Size Analysis of Soils. Results of these analyses are presented in Figure B-1. Each gradation provides the USCS group symbol, the sample description, and water content.

B.5 FALLING HEAD TEST

Potential infiltration rates were estimated from a series of falling-head infiltration tests conducted in the field in general accordance with guidelines and procedures for determining design infiltration rates presented in the Pierce County Stormwater Management and Site Development Manual (Manual) (2008). Falling-head test data from PIT-1 for the change in hydraulic head in inches versus elapsed time in hours are presented in Figure B-2.

B.6 REFERENCES

ASTM International (ASTM), 2009, 2009 Annual book of standards, Construction v. 04.08, Soil and rock (I): D 420 – D 5779: West Conshohocken, Pa.

Pierce County, Washington, 2008, Stormwater management and site development manual: Appendix III-A – Methods for determining design infiltration rates, Pierce County.

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ATTACHMENT C

IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL/ENVIRONMENTAL REPORT

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SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Attachment to and part of Report 21-1-21368-001

Date: January 17, 2011
To: Ms. Ruba Zumut
Berger/ABAM

IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL/ENVIRONMENTAL REPORT

CONSULTING SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

Consultants prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your consultant prepared your report expressly for you and expressly for the purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the consultant. No party should apply this report for any purpose other than that originally contemplated without first conferring with the consultant.

THE CONSULTANT'S REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

A geotechnical/environmental report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. Depending on the project, these may include: the general nature of the structure and property involved; its size and configuration; its historical use and practice; the location of the structure on the site and its orientation; other improvements such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask the consultant to evaluate how any factors that change subsequent to the date of the report may affect the recommendations. Unless your consultant indicates otherwise, your report should not be used: (1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); (2) when the size, elevation, or configuration of the proposed project is altered; (3) when the location or orientation of the proposed project is modified; (4) when there is a change of ownership; or (5) for application to an adjacent site. Consultants cannot accept responsibility for problems that may occur if they are not consulted after factors which were considered in the development of the report have changed.

SUBSURFACE CONDITIONS CAN CHANGE.

Subsurface conditions may be affected as a result of natural processes or human activity. Because a geotechnical/environmental report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time. Ask the consultant to advise if additional tests are desirable before construction starts; for example, groundwater conditions commonly vary seasonally.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical/environmental report. The consultant should be kept apprised of any such events, and should be consulted to determine if additional tests are necessary.

MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.

Site exploration and testing identifies actual surface and subsurface conditions only at those points where samples are taken. The data were extrapolated by your consultant, who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent such situations, you and your consultant can work together to help reduce their impacts. Retaining your consultant to observe subsurface construction operations can be particularly beneficial in this respect.

A REPORT'S CONCLUSIONS ARE PRELIMINARY.

The conclusions contained in your consultant's report are preliminary because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site. Actual subsurface conditions can be discerned only during earthwork; therefore, you should retain your consultant to observe actual conditions and to provide conclusions. Only the consultant who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations based on those conclusions are valid and whether or not the contractor is abiding by applicable recommendations. The consultant who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.

Costly problems can occur when other design professionals develop their plans based on misinterpretation of a geotechnical/environmental report. To help avoid these problems, the consultant should be retained to work with other project design professionals to explain relevant geotechnical, geological, hydrogeological, and environmental findings, and to review the adequacy of their plans and specifications relative to these issues.

BORING LOGS AND/OR MONITORING WELL DATA SHOULD NOT BE SEPARATED FROM THE REPORT.

Final boring logs developed by the consultant are based upon interpretation of field logs (assembled by site personnel), field test results, and laboratory and/or office evaluation of field samples and data. Only final boring logs and data are customarily included in geotechnical/environmental reports. These final logs should not, under any circumstances, be redrawn for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process.

To reduce the likelihood of boring log or monitoring well misinterpretation, contractors should be given ready access to the complete geotechnical engineering/environmental report prepared or authorized for their use. If access is provided only to the report prepared for you, you should advise contractors of the report's limitations, assuming that a contractor was not one of the specific persons for whom the report was prepared, and that developing construction cost estimates was not one of the specific purposes for which it was prepared. While a contractor may gain important knowledge from a report prepared for another party, the contractor should discuss the report with your consultant and perform the additional or alternative work believed necessary to obtain the data specifically appropriate for construction cost estimating purposes. Some clients hold the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes that aggravate them to a disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY.

Because geotechnical/environmental engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in their contracts, reports and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

The preceding paragraphs are based on information provided by the
ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland

APPENDIX B
LIST OF DRAWINGS

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APPENDIX B
LIST OF DRAWINGS

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UT14.02	SITE UTILITY PLAN SHEET 2
LD14.01	COURTYARD FURNISHINGS AND LAYOUT PLAN
LD14.02	SPORT COURT AND ENTRY PLAZA LAYOUT PLAN
LD14.03	BIKE SHELTER & GATE LAYOU PLAN
LD16.01	SITE DETAILS
LD16.02	FURNISHING DETAILS
LD16.03	SHELTER PLAN AND DETAILS
LI12.01	IRRIGATION PLAN
LI16.01	IRRIGATION DETAILS SHEET 1
LII16.02	IRRIGATION DETAILS SHEET 2
LP12.01	PLANTING PLAN
LP16.01	PLANTING DETAILS
	BASKETBALL COURT LIGHTING PLAN AND DETAILS
92PN UEPH – ARCHITECTURAL CONCEPT PLANS	
92PN-A-101	FIRST FLOOR PLAN
92PN-A-102	SECOND FLOOR PLAN
92PN-A-103	THIRD FLOOR PLAN
72PN UEPH – ARCHITECTURAL CONCEPT PLANS	
72PN-A-101	FIRST FLOOR PLAN
72PN-A-102	SECOND FLOOR PLAN
72PN-A-103	THIRD FLOOR PLAN
64PN UEPH – ARCHITECTURAL CONCEPT PLANS	
64PN-A-101	FIRST FLOOR PLAN
64PN-A-102	SECOND FLOOR PLAN
64PN-A-103	THIRD FLOOR PLAN

APPENDIX C
UITLITY CONNECTIONS

**ALL UTILITY CONNECTION DRAWINGS FOR APPENDIX C IS PROVIDED SEPARATELY **

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APPENDIX D
RESULTS OF FIRE-FLOW TESTS

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BergerABAM
1111 Main Street, Suite 300, Vancouver, Washington 98660-2958
360/823-6100 • 360/823-6101 Fax • www.abam.com

Nov. 8, 2010
By: SA

FY11 BARRACKS PROJECT
FIRE FLOW ANALYSIS TEST #1

- STATIC PRESSURE = 59 psi
- RESIDUAL PRESSURE = 56 psi
- FLOW @ RESIDUAL = 924 GPM

FLOW AVAILABLE @ 20 psi RESIDUAL

$$Q_A = Q_f \times \frac{h_r^{0.54}}{h_f^{0.54}}$$

h_r = 59 psi − 20 psi = 39 psi

h_f = 59 psi − 56 psi = 3 psi

Q_f = 924 GPM

$$Q_A = 924\ \text{GPM} \times \frac{(39)^{0.54}}{(3)^{0.54}}$$

$$Q_A = 924\ \text{GPM} \times \frac{7.23}{1.80} = \boxed{3{,}691\ \text{GPM}}$$

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NOV. 8, 2010

FY11 BARRACKS PROJECT BY: SA

FIRE FLOW ANALYSIS - TEST #2

- STATIC PRESSURE = 64 psi
- RESIDUAL PRESSURE = 61 psi
- FLOW @ RESIDUAL = 924 GPM

FLOW AVAILABLE @ 20 psi RESIDUAL

$$Q_A = Q_f \times \frac{h_r^{0.54}}{h_f^{0.54}}$$

$h_r = 64\text{ psi} - 20\text{ psi} = 44\text{ psi}$

$h_f = 64\text{ psi} - 61\text{ psi} = 3\text{ psi}$

$Q_f = 924\text{ gpm}$

$$Q_A = 924\text{ gpm} \times \frac{(44)^{0.54}}{(3)^{0.54}}$$

$$Q_A = 924\text{ gpm} \times \frac{7.71}{1.80} \simeq \boxed{3{,}940\text{ GPM}}$$

JOB NAME FY 11 BARRACKS PROJECT JOB NO. FABL-10-951 DATE 8/13/2010

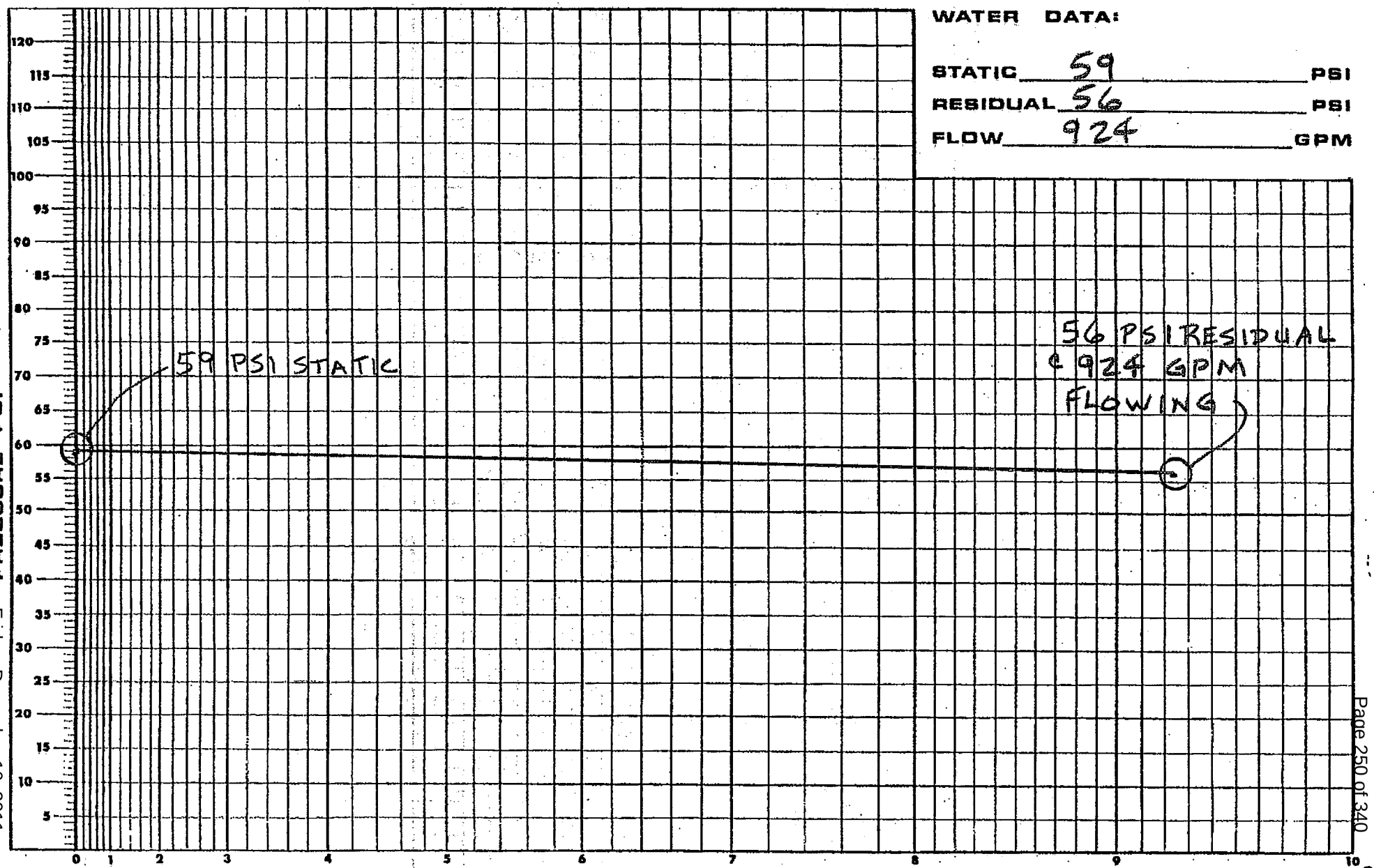
LOCATION FT. LEWIS, WA JBLM REPORT BY RELIANCE FIRE PROTECTION

WATER DATA:

STATIC 59 PSI

RESIDUAL 56 PSI

FLOW 924 GPM



FLOW - GPM (Q x 100)

TEST #1

JOB NAME FY 11 BARRACKS PROJECT JOB NO. FABL-10-951 DATE 8/13/2010

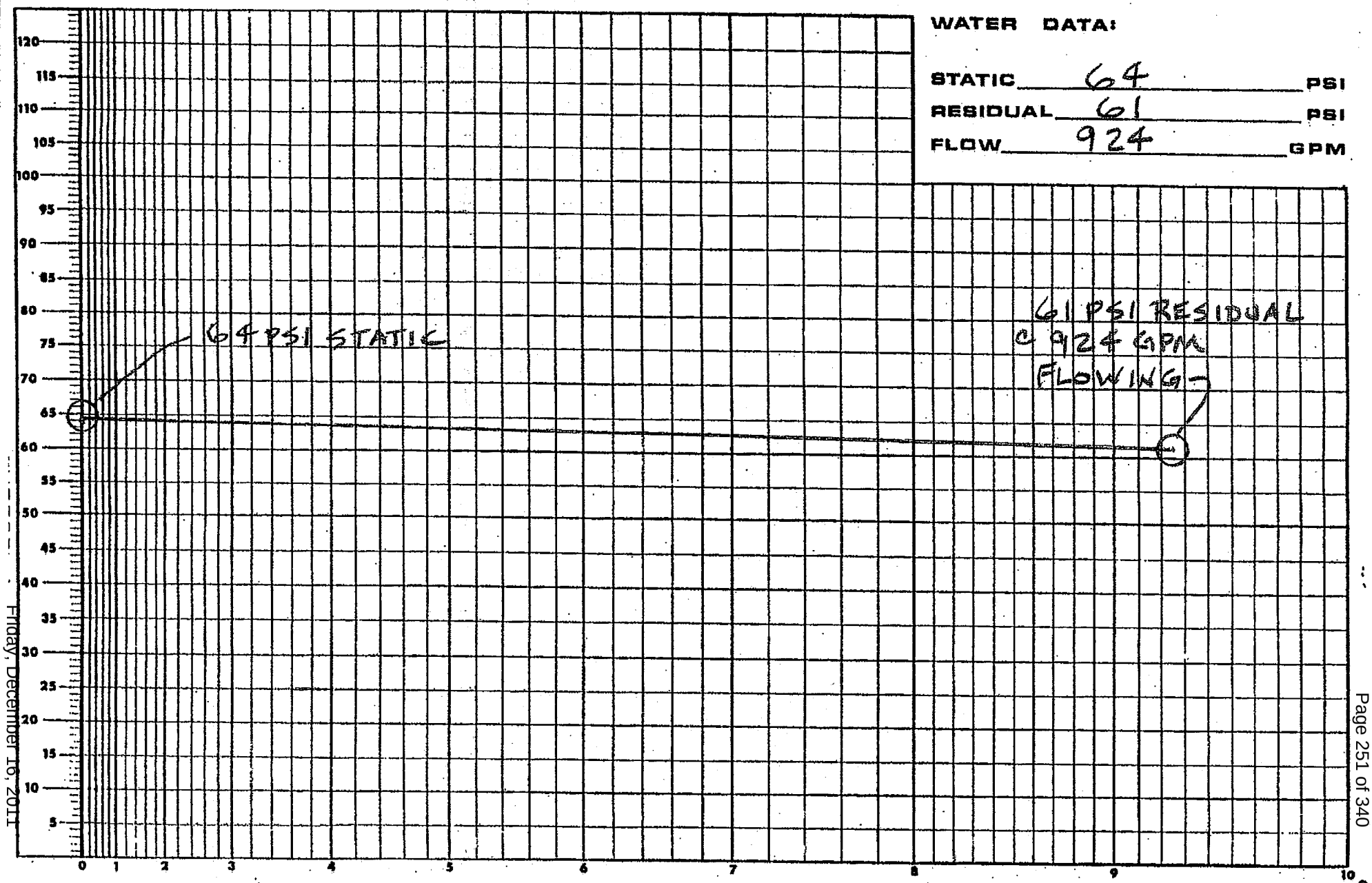
LOCATION FT. LEWIS, WA JBLM REPORT BY RELIANCE FIRE PROTECTION

WATER DATA:

STATIC 64 PSI

RESIDUAL 61 PSI

FLOW 924 GPM



FLOW - GPM (Q x 100)

TEST #2

SYMBOL AND LINETYPE LEGEND

- WATER MAIN LINE
- WATER SERVICE LINE
- METER
- WATER VALVE VAULT
- HYDRANT
- VALVE
- FIRE DEPT CONNECT
- POST INDICATOR VALVE
- SANITARY SEWER LINE
- SANITARY SIDE SEWER
- SANITARY MANHOLE
- SANITARY CLEANOUT
- GREASE TRAP
- STORM DRAIN LINE
- CATCH BASIN
- STORM DRAIN MANHOLE
- OVERHEAD POWER LINE
- DOWN GUY WIRE
- POWER POLE
- POWER POLE ID SYMBOL
- TRAFFIC SIGNAL HEAD
- TRAFFIC SIGNAL CONTROLLER
- TRAFFIC SIGNAL PULLBOX
- LIGHT POLE
- STREETLIGHT LUMINAIRE
- VEHICLE LOOP DETECTOR
- POLE MOUNTED TRANS.
- PAD MOUNTED TRANS.
- UNDERGROUND POWER LINE
- ELECTRICAL MANHOLE
- JUNCTION BOX
- TRANSFORMER VAULT
- ELECTRICAL METER
- UNDERGROUND COMM. LINE
- OVERHEAD COMM.
- COMM. MANHOLE
- COMM. SWITCHING STATION
- NATURAL GAS LINE
- GAS METER
- GAS MANHOLE
- GAS VALVE VAULT
- HWR — HOT WATER RETURN
- HWS — HOT WATER SUPPLY
- S — STEAM SERVICE LINE
- FENCE LINE
- CONIFEROUS TREE
- DECIDUOUS TREE
- SIGN
- TEST HOLE
- BOLLARD
- 292.0 — GROUND CONTOUR
- BENCH MARK
- BREAK
- HOR-VERT CONTROL POINT
- HOR CONTROL POINT
- VERT CONTROL POINT

SURVEY NOTES

THIS TOPOGRAPHIC SURVEY REPRESENTS A COMBINATION OF RECORD AND MEASURED INFORMATION. THE SURFACE VISIBLE FEATURES WERE LOCATED IN THE FIELD, AND UNDERGROUND LINES WERE MARKED IN THE FIELD BY UTILITY LOCATORS. THERE MAY EXIST ADDITIONAL UTILITY LINES THAT WERE NOT MARKED OR DID NOT APPEAR IN THE RECORDS.

HORIZONTAL AND VERTICAL CONTROL TABLE

HORIZONTAL DATUM - NAD 83/91 WCS SOUTH ZONE
VERTICAL DATUM - NAVD 88

BASIS OF COORDINATES -

HV 757 N-647634.11 E-1120414.05 Z-287.89
PT 7574 N-647515.44 E-1117337.83 Z-276.88

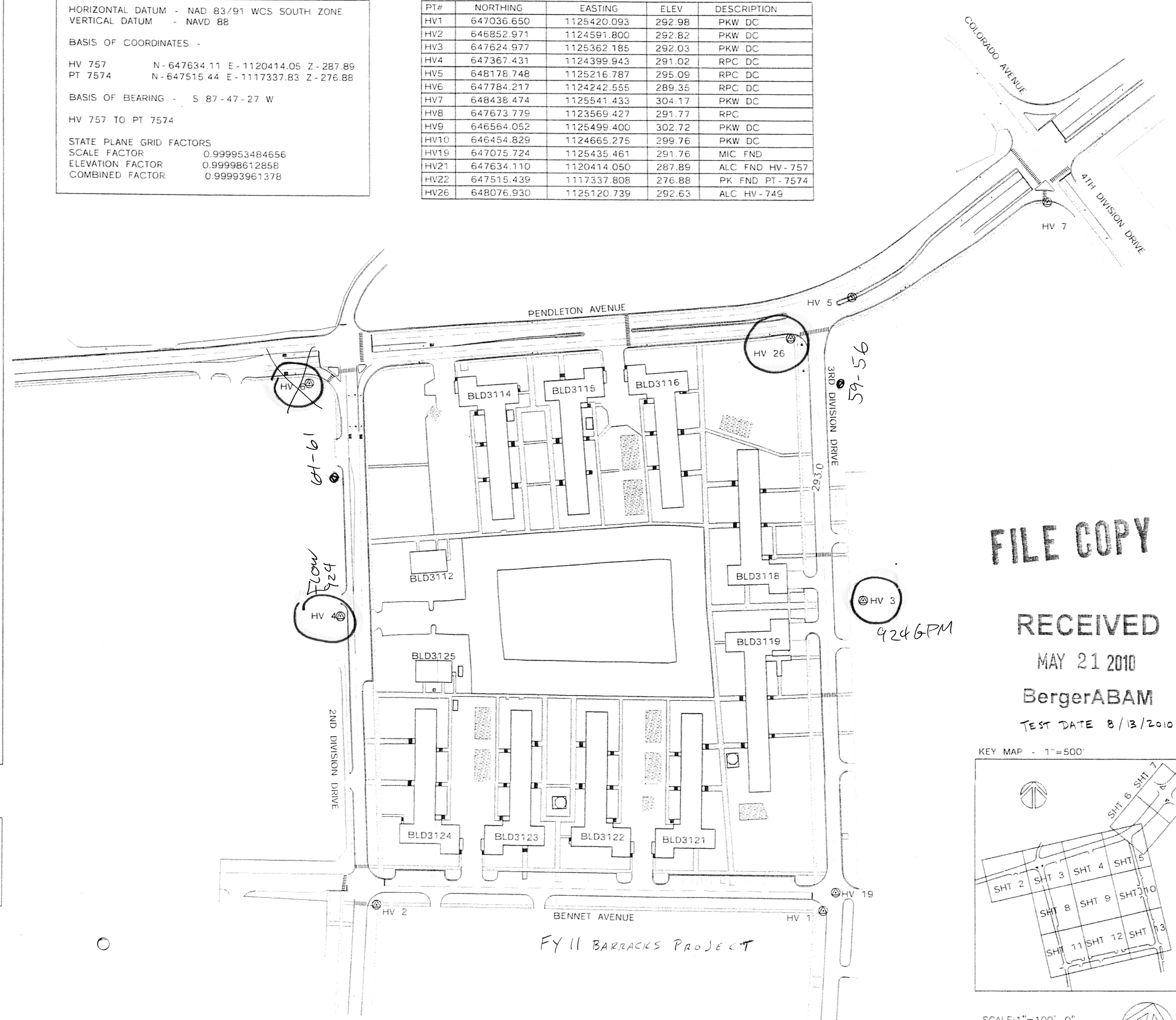
BASIS OF BEARING - S 87-47-27 W

HV 757 TO PT 7574

STATE PLANE GRID FACTORS
SCALE FACTOR 0.999953484656
ELEVATION FACTOR 0.99998612858
COMBINED FACTOR 0.99993961378

HORIZONTAL AND VERTICAL CONTROL MONUMENT TABLE

PT#	NORTHING	EASTING	ELEV	DESCRIPTION
HV1	647036.650	1125420.093	292.98	PKW DC
HV2	646852.971	1124591.800	292.82	PKW DC
HV3	647624.977	1125362.185	292.03	PKW DC
HV4	647367.431	1124399.943	291.02	RPC DC
HV5	648178.748	1125216.787	295.09	RPC DC
HV6	647784.217	1124242.555	289.35	RPC DC
HV7	648438.474	1125541.433	304.17	PKW DC
HV8	647673.779	1123569.427	291.77	RPC
HV9	646564.052	1125499.400	302.72	PKW DC
HV10	646454.829	1124665.275	299.76	PKW DC
HV19	647075.724	1125435.461	291.76	MIC FND
HV21	647634.110	1120414.050	287.89	ALC FND HV-757
HV22	647515.439	1117337.808	276.88	PK FND PT-7574
HV26	648076.930	1125120.739	292.63	ALC HV-749



FILE COPY

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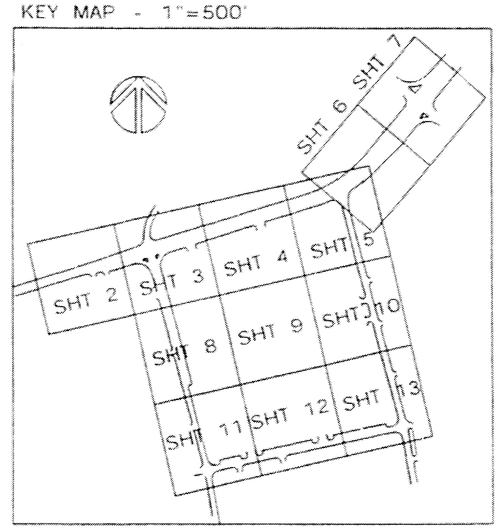
TEST DATE 8/13/2010

KEY MAP - 1"=500'



SCALE: 1"=100'-0"
100' 0 100'

IF SHEET MEASURES LESS THAN 22" X 34" IT IS A REDUCED PRINT. REDUCE SCALE ACCORDINGLY.

US Army Corps of Engineers
Seattle District

Symbol	Description	Date	Appr.	Symbol	Description

2010-05-21

JHM
RMF

U.S. ARMY ENGINEER DISTRICT, SEATTLE
CORPS OF ENGINEERS
SEATTLE, WASHINGTON

DOWL HKM
8625 164TH AVENUE NE, REDMOND, WA 98052
TEL (425) 883-9000 FAX (425) 883-9020

FY11 BARRACKS PH 64157

PROJECT SITE AND CONTROL
JOINT BASE LEWIS McCHORD WASHINGTON

Plate number:
V-001
Sheet 01 of 13

Section: APPENDIX D

W912GS-08-D-0044/45/46-0003
Page 252 of 340

Friday, December 16, 2011

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APPENDIX E
Environmental Information

Not Used

APPENDIX F
CONCEPTUAL AESTHETIC CONSIDERATIONS

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APPENDIX F

EAST DIVISION (BANANA BELT) CONCEPTUAL AESTHETIC CONSIDERATIONS

E-1 PURPOSE: Photographic examples of buildings are provided in this appendix to illustrate the range of architectural styles and exterior materials currently existing on Joint Base Lewis-McChord and the requirements for the East Division district.

E-2 CONTEXT: Where the facility to be constructed is an infill project, the exterior shall be consistent with adjacent structures to maintain a cohesive local campus with additional architectural detailing added to clearly reflect the military hierarchy of the facility in the troop complex. All buildings shall remain compatible with installation design themes and military identity.

E-3 DESIGN FREEDOM: Images presented in this appendix are intended to show the as-built neighborhood context of the East Division district as well as illustrate desired architectural aesthetic. These images are not intended to restrict the creative approach of the contractor's proposals, nor are they intended to constrain the selection of materials and systems beyond the requirements stipulated in this RFP.

E-4 **Exterior Finishes for East Division (Banana Belt) Facilities**

Base:	Material – Concrete
	Finish – Smooth
	Color – Gray
Field Masonry:	Material – Brick
	Finish – Rug Finish
	Color – 50/50 mix of Columbia Red and Autumn Blend
	Manufacturer – Mutual Materials
Mortar:	Color – Standard Gray
Field Metal:	Material – Rainscreen Metal Panels
	Color – Clear Annodized
	Manufacturer – Dri-Design
Roof:	Material – Standing Seam Metal
	Color – Cool Zinc Gray
	Manufacturer – AEP Span
Gutter/Fascia:	Match roof color
Downspout:	Match roof or wall color (verify with DPW)
Soffit:	Match roof color if no overhang; match wall color if overhang
Wdw/Door Frame:	Color – Clear Anodized
Wdw/Door Glass:	Color – Clear (Low-E is acceptable)
Sun Shade:	Color – Clear Anodized
Translucent Panel:	Color – Crystal/Crystal
	Manufacturer – Major Industries

Image 1 – Off installation facility, Reid Campus Center at Whitman College, Walla Walla, WA
Illustrates mass & void use of materials, modulation of façade, elevated main entry, glazed element at entry, extension of windows to underside of soffit, and windows wrapping the corners

Image 2 – Battle Command Training Center on Railroad Avenue, Lewis Main (not located within East Division district)
Illustrates window rhythm, hip roof, and materials use

Image 3 – Architectural renderings of future Battalion HQ facility within East Division district; perspective, left elevation, front elevation, back elevation, and right elevation
Illustrates ideal materials use and architectural style for this facility type

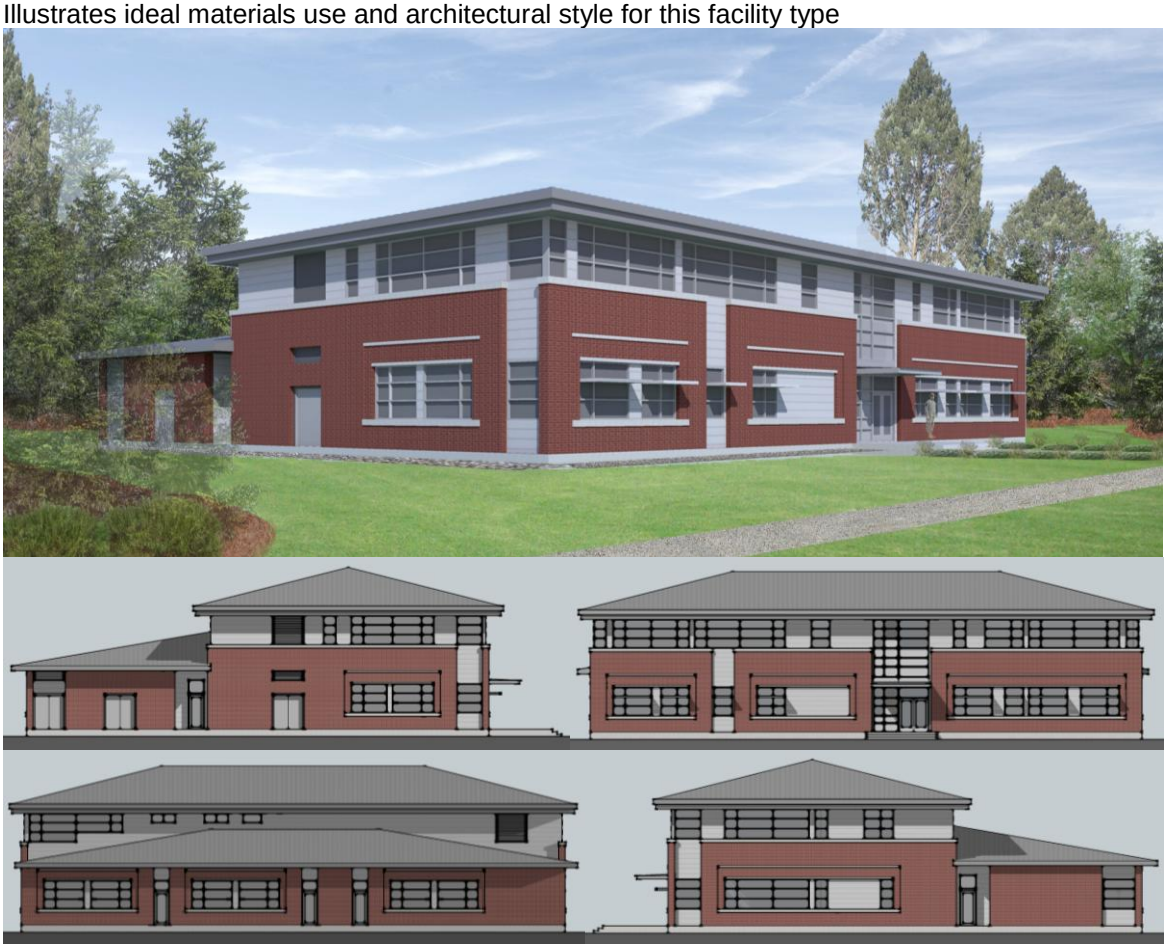


Image 4 – Architectural renderings of future COF within East Division district; perspective, front elevation, back elevation, and side elevation
Illustrates ideal materials use and architectural style for this facility type

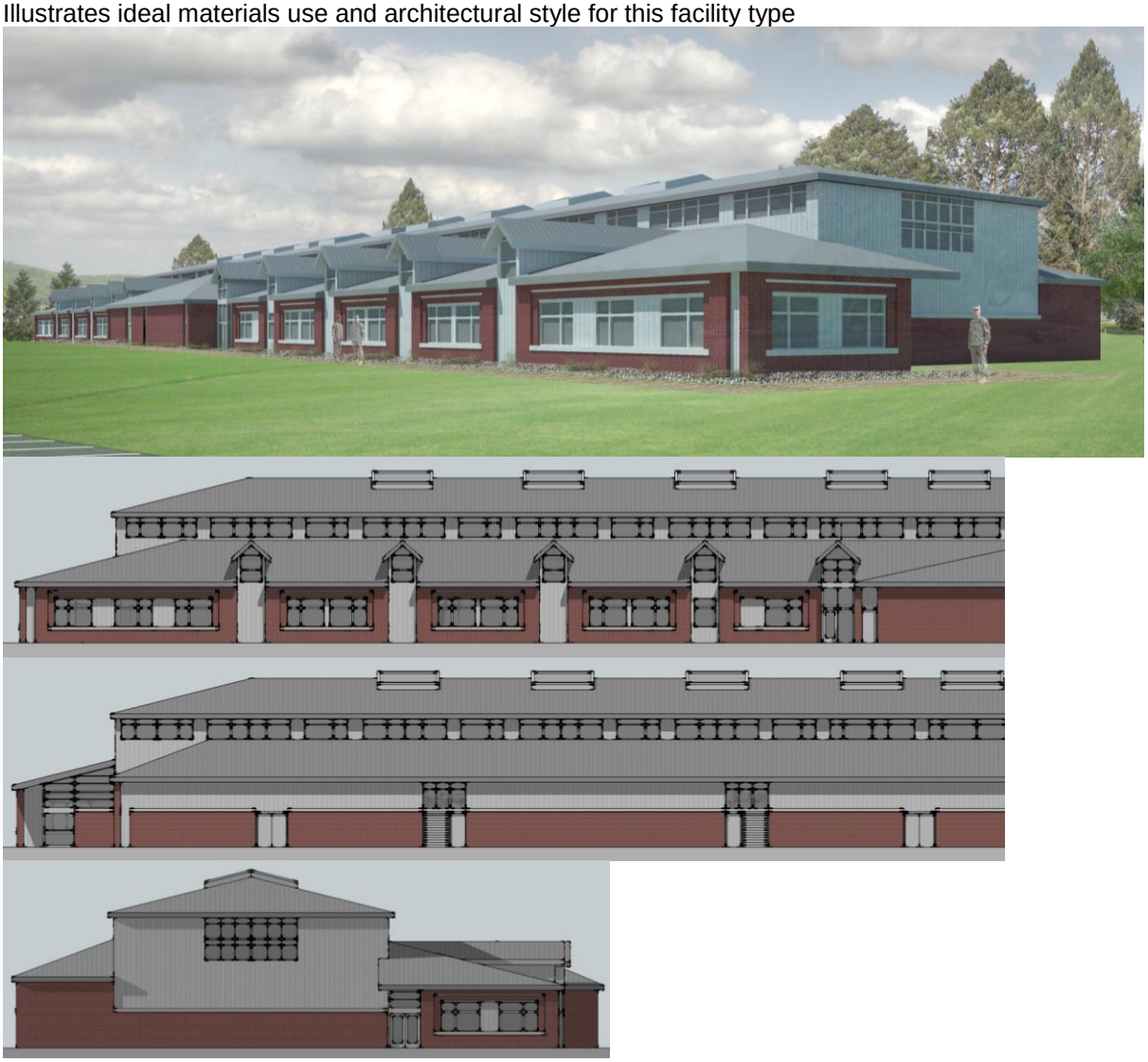


Image 5 – Architectural renderings of future DFAC within East Division district; perspective, front elevation, back elevation, left elevation, and right elevation
Illustrates ideal materials use and architectural style for this facility type

Image 6 – Architectural renderings of future TEMF within East Division district; perspective, front elevation, back elevation, left elevation, and right elevation
Illustrates ideal materials use and architectural style for this facility type

Image 7 – Architectural renderings of future UEPH facility within East Division district; perspective, front elevation, back elevation, and side elevation
Illustrates ideal materials use and architectural style for this facility type

Image 8 – Split Window
Illustrates day-lighting and view window split with permanent interior and exterior architectural elements that prevent summer sun penetration to interior spaces, while allowing daylight and views

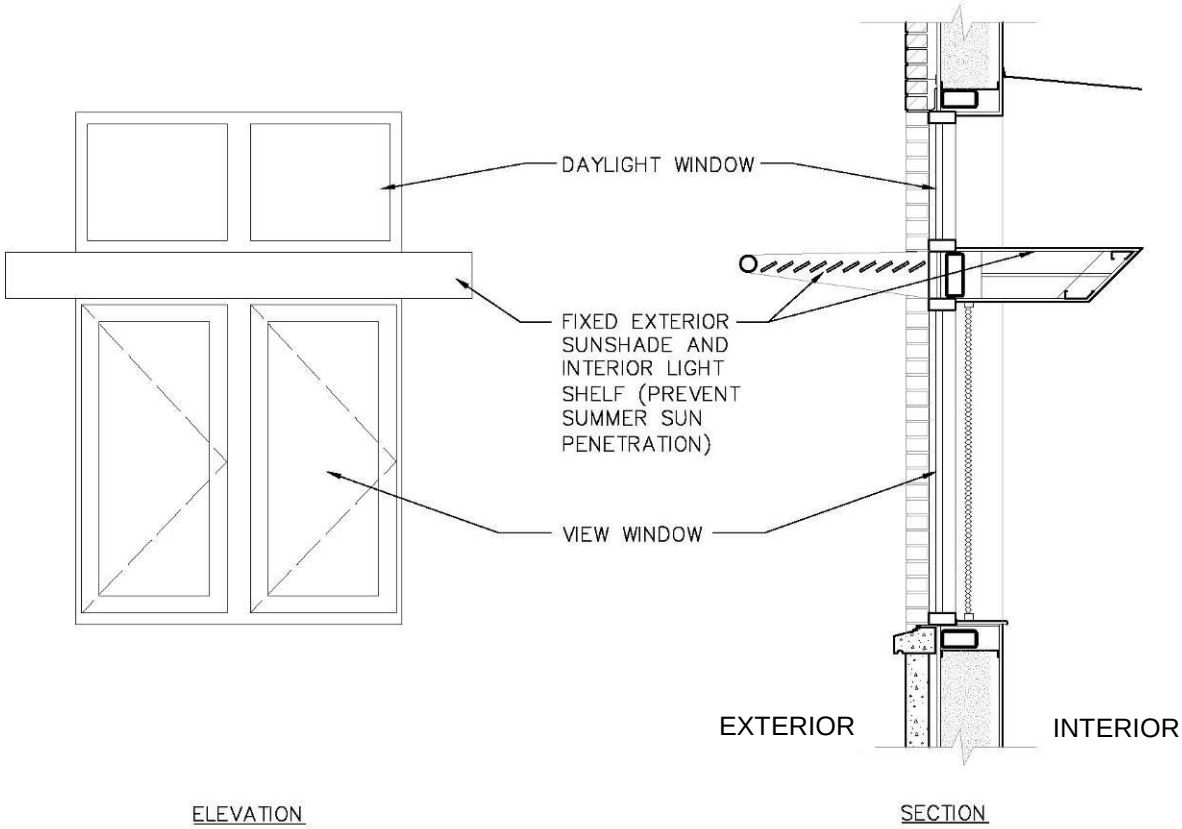
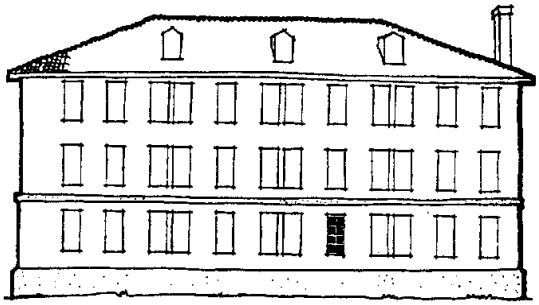
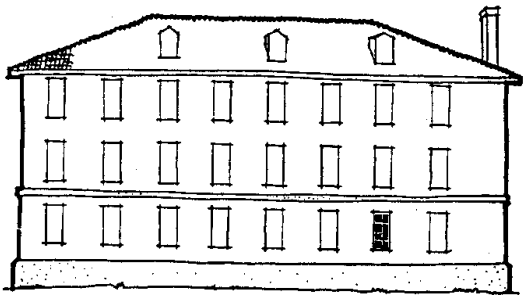


Image 9 – Syncopated Rhythm of Building Elements
Illustrates a syncopated rhythm of fenestration that helps break up the apparent mass of a building, compared with a regular pattern which can be monotonous

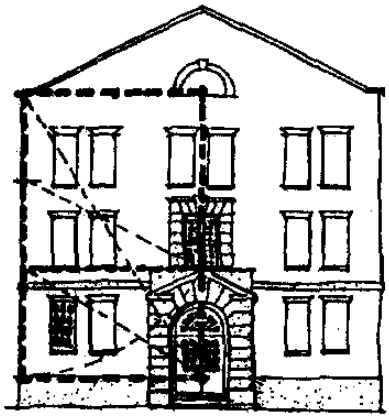


This - syncopated rhythm of fenestration



Not this – regularly spaced pattern of fenestration

Image 10 – Golden Section
Illustrates use of the Golden Section (a/b=1.618) in determining proportion and massing



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APPENDIX G
GIS Data

Not Used

EXTERIOR SIGNAGE

1 PURPOSE: Photographic examples of exterior signage are provided in this appendix to illustrate the range of free-standing exterior building signs currently existing on North Fort Lewis. Exterior signs indicating the occupant unit(s) are required for all facilities, except for UEPH. Provide signage that is weather resistant; consistent in design, materials and color with its building; and sufficiently illuminated to be legible at night. Because occupant units will often relocate, signage should permit changing text or a sign placard without significant reconstruction of the supporting structure.

2 CONTEXT: Where the facility to be constructed is an infill project (such as the Enlisted Personnel Dining Facility), the exterior, free standing sign structure should be consistent with adjacent buildings and signage. Where a new facility will develop the aesthetic identity for that zone, signage in that area may be developed to present a new image. However, all signage must be compatible with installation design themes and military identity.

Photo 1 – Building/Unit Identification – Dining Facility

Photo 2 – Building/Unit Identification – Battalion Headquarters (before completion of text)

Photo 3 – Building/Unit Identification – Brigade Headquarters

Photo 4 – Building/Unit Identification – Battalion Headquarters

Photo 5 – Building/Unit Identification – Company Operations Facilities

Photo 6 – Building Number Sign – Provide 4 total, one each elevation (diagonal pairs).

APPENDIX I
ACCEPTABLE PLANTS LIST AND
JBLM OREGON WHITE OAK PLANTING PLAN

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PROHIBITED AND ACCEPTABLE PLANTS LISTS

PROHIBITED TREES

BOTANICAL NAME	COMMON NAME
ACER MACROPHYLLUM	BIGLEAF MAPLE
ACER NEGUNDO	BOX ELDER
ACER SACCHARINUM	SILVER MAPLE
ALNUS SP.	ALDER
ARAUCARIA ARAVCANA	MONKEY PUZZLE
ARBUTUS MENZIESSI	MADRONE
BETULA PENDULA	WHITE BIRCH
CATALPA SP.	CATALPA
CRATAEGUS SP.	HAWTHORN
ELAEAGNUS ANGUSTIFOLIA	RUSSIAN OLIVE
LABURNUM SP.	GOLDEN CHAIN TREE
PICEA PUNGENS	COLORADO SPRUCE
PLATANUS X ACERIFOLIA	LONDON PLANE TREE
PLATANUS OCCIDENTALIS	SYCAMORE
POPULUS TRICHOCARPA	BLACK COTTONWOOD
POPULUS SP.	POPLARS
ROBINIA PSEUDOACACIA	BLACK LOCUST
SALIX SP.	WILLOW
SOPHORA JAPONICA	PAGODA TREE
SORBUS AUCUPARIA	MOUNTAIN ASH
ULMUS AMERICANA	AMERICAN ELM
ULMUS PARVIFOLIA	CHINESE ELM
ULMUS PUMILA	SIBERIAN ELM

ACCEPTABLE PLANTS (DTN are drought tolerant natives)

BOTANICAL NAME	COMMON NAME	DTN
TREES		
ACER CIRCINATUM	VINE MAPLE	X
ACER GINNALA 'FLAME'	AMUR MAPLE	
ACER PALMATUM	JAPANESE MAPLE	
ACER RUBRUM ‘FRANKS RED'	SUNSET RED MAPLE	
ACER RUBRUM 'SCARLET SENTINEL'	RED MAPLE SENTINEL	
ACER SACCHRUM ‘BONFIRE’	BONFIRE SUGAR MAPLE	
ACER SACCHRUM 'GREEN MOUNTAIN	GREEN MOUNTAIN SUGAR MAPLE	
CALOCEDRUS DECURRENS	INCENSE CEDAR	
CARPINUS BETULUS 'FASTIGIATA'	COLUMNAR HORNBEAM	
CERCIS OCCIDENTALIS	WESTERN REDBUD	
COTINUS COGGYGRIA 'PURPUREUS'	SMOKE TREE	
CUPRESSOCYPARIS LEYLANDII	LEYLAND CYPRESS	
FRAXINUS PENNSYLVANICA 'PATMORE,' 'MARSHALL'S SEEDLESS', ‘CIMMZAM’	PATMORE ASH, SEEDLESS GREEN ASH, CIMMARON ASH	
GINKGO BILOBA (plant male trees only)	MAIDENHAIR TREE	
GLEDITSIA TRICANTHOS 'SKYCOLE'	SKYLINE HONEY LOCUST	
JUNIPERUS CHINENSIS ‘ROBUSTA GREEN’	ROBUSTA GREEN CHINESE JUNIPER	
JUNIPERUS SCOPULORUM 'BLUE HEAVEN'	ROCKY MOUNTAIN JUNIPER	
LARIX OCCIDENTALIS	WESTERN LARCH	X
LIRIODENDRON TULIPIFERA	TULIPTREE	
MALUS 'PRAIRIEFIRE'	PRAIRIEFIRE CRABAPPLE	
MALUS 'SUGARTYME'	SUGARTYME CRABAPPLE	
MALUS TRANSITORIA 'SCHMIDTCUTLEAF'	GOLDEN RAINDROPS CRABABPPLE	
PARROTIA PERSICA	PERSIAN PARROTIA	
PINUS CONTORTA	SHORE PINE	X
PINUS FLEXILIS ‘VANDERWOLFS PYRAMID’	LIMBER PINE	
PINUS NIGRA	AUSTRIAN PINE	
PINUS PONDEROSA	PONDEROSA PINE	X
PINUS SYLVESTRUS	SCOTCH PINE	
PSEUDOTSUGA MENZIESII	DOUGLAS FIR	X
PYRUS CALLERYANA 'CHANTICLEER'	FLOWERING PEAR	
QUERCUS GARRYANA	OREGON OAK	X
QUERCUS ROBUR ‘FASTIGIATA’	COLUMNAR ENGLISH OAK	
SEQUOIA SEMPERVIRENS	COAST REDWOOD	X
STYRAX OBASSIA	FRAGRANT SNOWBELL	
THUJA PLICATA	WESTERN RED CEDAR	X
THUJA PLICATA 'HOGAN'	HOGAN CEDAR	
TILIA TOMENTOSA 'STERLING SILVER'	STERLING SILVER LINDEN	
TSUGA HETEROPHYLLA	WESTERN HEMLOCK	X
TSUGA CANADENSIS	CANADA HEMLOCK	X
ULMUS PARVIFOLIA ‘FRONTIER’	FRONTIER ELM	

SHRUBS		
AMELANCHIER ALNIFOLIA	SASKATOON	X
ARBUTUS UNEDO	STRAWBERRY TREE	
ARBUTUS UNEDO 'COMPACTA'	COMPACT STRAWBERRY TREE	
BUXUS SEMPERVIRENS ‘SUFFRUTICOSA’	TRUE DWARF BOXWOOD	
CARYOPTERIS X CLANDONENSIS	BLUEBEARD	
CISTUS HYBRIDUS	WHITE ROCKROSE	
CISTIS X PURPUREUS	PURPLE ROCKROSE	
CORNUS SERICEA ‘ISANTI’	ISANTI DOGWOOD	
CORNUS SERICEA ‘FLAVIRAMEA’	YELLOW-TWIG DOGWOOD	
CORNUS STOLONIFERA ‘OCCIDENTALIS’	REDOSIER DOGWOOD	X
CORNUS STOLONIFERA 'KELSEYII'	DWARF REDOSIER DOGWOOD	
CORNUS STOLONIFERA 'SILVER AND GOLD'	SILVER AND GOLD DOGWOOD	
DAPHNE CNEORUM 'RUBY GLOW'	RUBY GLOW GARLAND DAPHNE	
ELEAGNUS PUNGENS ‘MACULATA’	GOLDEN ELEAGNUS	
EUONYMUS ALATA 'COMPACTA'	COMPACT BURNING BUSH	
HEBE 'AUTUMN GLORY', 'PATTY'S PURPLE,' etc..	HEBE	
HELICTOTRICHON SEMERVIRENS	BLUE OAT GRASS	
HOLODISCUS DISCOLOR	OCEAN SPRAY	X
LONICERA PILEATA	PRIVET HONEYSUCKLE	
MAHONIA AQUIFOLIUM	TALL OREGON GRAPE	X
MAHONIA AQUIFOLIUM 'COMPACTUM'	COMPACT OREGON GRAPE	X
MYRICA CALIFORNICA	WAXMYRTLE	
NANDINA DOMESTICA many varieties	HEAVENLY BAMBOO	
OEMLERIA CERASIFORMIS	INDIAN PLUM	X
OSMANTHUS DELAVAYI	OSMANTHUS	
PACHISTIMA MYRSINITES	OREGON BOX	X
PHILADELPHUS LEWISII	MOCK ORANGE	X
PICEA ABIES 'NIDIFORMIS'	BIRD'S NEST SPRUCE	
POLYSTICHUM MUNITUM	SWORDFERN	X
POTENTILLA FRUTICOSA	SHRUBBY CINQUEFOIL	X
RHUS GLABRA	SMOOTH SUMAC	X
RIBES AUREUM	GOLDEN CURRENT	X
RIBES SANGUINEUM	RED FLOWERING CURRANT	X
ROSA RUGOSA (many varieties)	RAMANAS ROSE	
ROSA WOODSII	WOOD’S ROSE	X
SENECIO GREYI	SENECIO	
SKIMMIA JAPONICA	JAPANESE SKIMMIA	
SKIMMIA REEVESIANA	REEVES SKIMMIA	
SPIRAEA BETULIFOLIA	BIRCH-LEAF SPIRAEA	X
SYMPHORICARPUS ALBUS	SNOWBERRY	X
SYRINGA MEYERI ‘PALIBAN’	DWARF KOREAN LILAC	
TAXUS BACCATA 'REPANDENS'	SPREADING ENGLISH YEW	
VACCINIUM OVATUM	EVERGREEN HUCKLEBERRY	X
VIBURNUM DAVIDII	DAVID VIBURNUM	

GROUND COVERS		
BOTANICAL NAME	**COMMON NAME**	**DTN**
AJUGA REPTANS 'BURGANDY GLOW', GAIETY, etc.	CARPET BUGLE	
ARCTOSTAPHYLOS UVA URSI	KINNIKINNIK	X
ARCTOSTAPHYLOS UVA URSI 'VANCOUVER JADE'	KINNIKINNIK VANCOUVER JADE	
ARCTOSTAPHYLOS X MEDIA	MANZANITA	X
COTONEASTER DAMMERI 'LOWFAST'	BEARBERRY COTONEASTER	
EPIMEDIUM 'ROSE QUEEN,' 'NIVIUM,' etc.	BISHOP'S HAT	
EUONYMUS FORTUNEI ‘COLORATA’	PURPLE-LEAF WINTER CREEPER	
FRAGARIA CHILOENSIS 'LIPSTICK,' 'PINK PANDA'	BEACH STRAWBERRY	X
GAULTHERIA SHALLON	SALAL	X
HYPERICUM CALYCINUM	ST. JOHNSWORT	
JUNIPERUS CONFERTA 'BLUE PACIFIC'	SHORE JUNIPER	
JUNIPERUS HORIZONTALIS 'BLUE CHIP'	BLUE CHIP JUNIPER	
JUNIPERUS HORIZONTALIS 'PRINCE OF WALES'	PRINCE OF WALES JUNIPER	
JUNIPERUS HORIZONTALIS 'WILTONII'	WILTON JUNIPER	
JUNIPERUS PROCUMBENS 'NANA'	COMPACT GARDEN JUNIPER	
JUNIPERUS SABINA "BROADMOOR’	BROADMOOR JUNIPER	
LITHODORA DIFFUSA 'GRACE WARD,' 'HEAVENLY BLUE'	LITHODORA	
MAHONIA NERVOSA	LONGLEAF MAHONIA	X
MAHONIA REPENS	CREEPING MAHONIA	X
OPHIOPOGON JAPONICUS 'NANA'	DWARF MONDO GRASS	
RUBUS CALYCINOIDES 'EMERALD CARPET'	CREEPING RUBUS	
THYMUS PSEUODOLANUGINOSUS	WOOLY THYME	
THYMUS SERPHYLLUM	WILD THYME	
VERONICA PEDUNCULARIS ‘GEORGIA BLUE’	GEORGIA BLUE SPEEDWELL	
VINCA MINOR 'ATROPURPPUREA'	BURGANDY DWARF PERIWINKLE	

GRASSES		
BOTANICAL NAME	**COMMON NAME**	**DTN**
Seed MIX A: use at lawn areas		
LOLIUM PERENNE (see note 1)	TURF TYPE PERENNIAL RYEGRASS	
Sod MIX B: use at biofiltration, infiltration and lawn areas.		
FESTUCA ARUNDINACEA	TALL FESCUE	
AGROSTIC TENIUS	COLONIAL BENTGRASS	
AGROSTIS ALBA	REDTOP	
Seed MIX C: use at field grass areas		
FESTUCA TRACHYPHYLLA	HARD FESCUE	
FESTUCA OVINA L.	SHEEP FESCUE	
FESTUCA RUBRA L.	RED FESCUE	

Note 1: Use a three way sports blend of improved varieties

Attachment for Joint Base Lewis-McChord Oregon White Oak Planting Plan

Plantings Location

All planting locations for oak mitigation will be down range within designated training areas as directed by the Contracting Officer and coordinated with the Public Works Fish & Wildlife staff.

Planting Density

Oak trees are to be planted in a random arrangement with a high density to account for natural mortality. The spacing can range from 8 to 15 feet.

Where to Get Oregon White Oak Seedlings

There are a number of commercial nurseries in Oregon, Washington and British Columbia that carry the Oregon White Oak (*Quercus garryana*). The tree stock to be purchased will be in one or two gallon containers. The minimum diameter of each oak at the base stem should be at least (1/4" inch or 6mm) in diameter.

When to Plant Oak Seedlings

Planting of Oregon White Oak will occur between November and March. It is recommended to plant in the fall when the first rains have soaked the soil and before the temperatures begin to warm in the early spring. Trees planted in the fall have a better chance at survival due to its roots getting established through the first summer.

Planting Techniques

Oregon White Oak trees will be planted using an auger to loosen the rocky prairie soils of the South Puget Sound.

Vegetation will be removed with a shovel or hand tool in a no more than 12 inch diameter of the planting hole. Augured holes will be several inches deeper and several inches wider than the tree root system.

For the potted trees that are root bound, prune off any portion of the taproot. If a circled taproot is planted, growth will be severely hampered.

The root collar (point where the taproot becomes stem) should be just below the ground level. Pack the soil firmly.

Planting Protection

All Oregon White Oak trees that are planted will receive a four inch layer of organic mulch that extends at least four feet in diameter from the seedling in all directions.

Once planted, Oregon White Oak trees will be protected with solid walled, blue tree shelters (Protex – Pro/Gro Solid Tube Tree Protectors or approved equal in strength and durability) that will be staked into the ground with bamboo stakes. These shelters protect seedlings from browse and burrowing rodents, as well as increase height growth rate.

Planting Maintenance

Oregon White Oak trees will be maintained and monitored for one year. During the first summer they will be watered appropriately to ensure survival. After one year of maintenance all dead Oregon White Oak trees will be replaced and replanted.

Identification of plants

Planted seedlings will have a distinctive color coding on the tube protectors which can be spray painted or ribboning. The color coding shall distinguish the plantings installed under this specific contract. In addition, stakes shall be driven (Minimum of three feet in height above ground at all corners of the planted areas. The stakes will have an attached legible tag or marker with the Contract Number, Contract Title and the Contractor's name .

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APPENDIX J
DRAWINGS

ALL REFERENCE DRAWINGS FOR APPENDIX J IS PROVIDED SEPARATELY

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APPENDIX K
Utility Cost Information
(REV 1.5, 18 February, 2010)

The following utility rates for this installation are provided for design:

Electrical:

Demand Charge - $ 3.61	per kilowatt (at Substation)
Energy Charge - $ 0.03	per kilowatt-hour (at Substation)
Blended Rate - $ 0.04473	per kilowatt-hour (blended annual energy and demand cost) (this rate includes a delivery charge)

Natural Gas:

Commodity Charge Rate - $ 0.955	per therm
Commodity Charge Rate - $ 0.6712	per therm (for interruptible service only – interruptible rate requires availability of secondary fuel source. North Fort Lewis uses an air/propane fuel system installed parallel with natural gas service.

Water:

Commodity Charge Rate - $ 0.696	per thousand gallons

Sewer:

Commodity Charge Rate - $ 1.1864	per thousand gallons

Purchased Central Steam

$13.608 per 1,000 LB

Purchased High Temperature Water:

$

Purchased Chilled Water:

Service not available at project sites.

LEED Project Credit Guidance

This spreadsheet indicates Army required credits, Army recommendations regarding preference and avoidance of individual credits, project-specific ranking of individual point preferences, discussion of Installation roles in support of individual credits, and issues that Government Project Delivery Teams (PDTs) need to be aware of relating to individual credits. The Resources section that follows provides references and resources that relate to LEED, including policy and legal requirements, design guides and documentation resources.

LEED 2.2 Credit Paragraph	LEED Project Credit Guidance	Army Guidance: Required - Preferred - Avoid	Project Preference Ranking: (1=most preferred, blank=no preference)	
PAR	**FEATURE**			**REMARKS**
CATEGORY 1 - SUSTAINABLE SITES (14 POSSIBLE POINTS)				
SSPR1	Construction Activity Pollution Prevention (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met. Related to compliance with 40 CFR 122.26 (Clean Water Act).
SS1	Site Selection	Pref		See paragraph LEED CREDITS COORDINATION for information relating to this credit.
SS2	Development Density & Community Connectivity - OPTION 1 DENSITY		X	Credit is determined by Installation's site selection. See paragraph LEED CREDITS COORDINATION for information relating to this credit. Required development density is uncommon on Installations.
	Development Density & Community Connectivity - OPTION 2 CONNECTIVITY		X	Credit is determined by Installation's site selection. See paragraph LEED CREDITS COORDINATION for information relating to this credit.
SS3	Brownfield Redevelopment		X	Credit is determined by Installation's site selection. See paragraph LEED CREDITS COORDINATION for information relating to this credit. Remediation performed by others (outside of construction contract) qualifies for this credit. Selection of previously remediated sites does not qualify.

LEED 2.2 Credit Paragraph	LEED Project Credit Guidance	Army Guidance: Required - Preferred - Avoid	Project Preference Ranking: (1=most preferred, blank=no preference)	
PAR	**FEATURE**			**REMARKS**
SS4.1	Alternative Transportation: Public Transportation Access	Pref	X	Credit is determined by Installation's site selection. See paragraph LEED CREDITS COORDINATION for information relating to this credit.
SS4.2	Alternative Transportation: Bicycle Storage & Changing Rooms	Pref		Credit is easily earned at minimal first cost.
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.
SS4.3	Alternative Transportation: Low Emitting & Fuel Efficient Vehicles - OPTION 2	Pref		Credit is easily earned at minimal first cost.
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		Credit is easily earned at minimal first cost.
SS5.1	Site Development: Protect or Restore Habitat			Ability to earn this credit depends greatly on size of project site and land made available within site boundary (but outside development footprint) that is made available for habitat.
SS5.2	Site Development: Maximize Open Space	Pref		AT/FP standoffs often create open space required to earn this credit. Particularly for vehicle-oriented facilities requiring adjacent hardstand, earning this credit may require larger site boundary to obtain credit.
SS6.1	Stormwater Design: Quantity Control	Pref		Related to compliance with 40 CFR 122.26 (Clean Water Act).
SS6.2	Stormwater Design: Quality Control			
SS7.1	Heat Island Effect: Non-Roof	Pref		

LEED 2.2 Credit Paragraph	LEED Project Credit Guidance	Army Guidance: Required - Preferred - Avoid	Project Preference Ranking: (1=most preferred, blank=no preference)	
PAR	**FEATURE**			**REMARKS**
SS7.2	Heat Island Effect: Roof	Pref		Coordinate with nearby airfield requirements, which may preclude this credit.
SS8	Light Pollution Reduction	Pref		Credit is easily earned at minimal first cost. May not be feasible for Access Control Points and other projects subject to Chapter 11 Security Lighting requirements of UFC 3-550-03FA.
CATEGORY 2 – WATER EFFICIENCY (5 POSSIBLE POINTS)				
WE1.1	Water Efficient Landscaping: Reduce by 50%	Rqd		
WE1.2	Water Efficient Landscaping: No Potable Water Use or No Irrigation	Rqd		
WE2	Innovative Wastewater Technologies - OPTION 1			
WE2	Innovative Wastewater Technologies - OPTION 2			
WE3.1	Water Use Reduction: 20% Reduction	Pref		Related to Army mandate for waterless urinals beginning FY10.
WE3.2	Water Use Reduction: 30% Reduction	Pref		
CATEGORY 3 – ENERGY AND ATMOSPHERE (17 POSSIBLE POINTS)				
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.

LEED 2.2 Credit Paragraph	LEED Project Credit Guidance	Army Guidance: Required - Preferred - Avoid	Project Preference Ranking: (1=most preferred, blank=no preference)	
PAR	**FEATURE**			**REMARKS**
EA1	Optimize Energy Performance	Rqd	Rqd	Earning of LEED EA1 points as indicated in paragraph ENERGY CONSERVATION, as a minimum, is required. Note that LEED points calculation is based on energy cost reduction.
EA2.1	On-Site Renewable Energy			
EA3	Enhanced Commissioning	Rqd	1	
EA4	Enhanced Refrigerant Management			Availability issues must be addressed.
EA5	Measurement & Verification			Credit relates to EPACT metering requirements. Provider and funding of post-occupancy activities must be coordinated. Assume Government will not provide post-occupancy activities.
EA6	Green Power		X	Credit is determined by Installation's purchase of green power. See paragraph LEED CREDITS COORDINATION for information relating to this credit.
CATEGORY 4 – MATERIALS AND RESOURCES (13 POSSIBLE POINTS)				
MRPR1	Storage & Collection of Recyclables (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met. Installation provides collection service and outside receptacle needs coordination.
MR1.1	Building Reuse: Maintain 75% of Existing Walls, Floors & Roof			
MR1.2	Building Reuse: Maintain 95% of Existing Walls, Floors & Roof			

LEED 2.2 Credit Paragraph	LEED Project Credit Guidance	Army Guidance: Required - Preferred - Avoid	Project Preference Ranking: (1=most preferred, blank=no preference)	
PAR	**FEATURE**			**REMARKS**
MR1.3	Building Reuse: Maintain 50% of Interior Non-Structural Elements			
MR2.1	Construction Waste Management: Divert 50% From Disposal	Rqd	Rqd	Project requirement. See paragraph CONSTRUCTION WASTE MANAGEMENT for additional information. Contractor diversion data is provided to Installation for inclusion in Installation waste diversion reporting. LEED project totals may include onsite demolition by others. If this applies to the project, the PM furnishes this diversion data to the Contractor for inclusion in the project total.
MR2.2	Construction Waste Management: Divert 75% From Disposal	Pref		
MR3.1	Materials Reuse: 5%			Installation provides information on any salvage/refurbished materials available on-post for incorporation in project.
MR3.2	Materials Reuse: 10%			Installation provides information on any salvage/refurbished materials available on-post for incorporation in project.
MR4.1	Recycled Content: 10% (post-consumer + 1/2 pre-consumer)	Pref		Relates directly to EPA CPG compliance and is highly preferred. Federal regulation as well as Federal, DOD and Army policies require purchase of products that contribute to this credit.
MR4.2	Recycled Content: 20% (post-consumer + 1/2 pre-consumer)	Pref		Relates directly to EPA CPG compliance and is highly preferred. Significant concrete and steel in project facilitate earning of this credit.
MR5.1	Regional Materials:10% Extracted, Processed & Manufactured Regionally			Because credit requires regional extraction, earning this credit depends on project location relative to extraction locations of required materials.
MR5.2	Regional Materials:20% Extracted, Processed & Manufactured Regionally			Because credit requires regional extraction, earning this credit depends on project location relative to extraction locations of required materials.

LEED 2.2 Credit Paragraph	LEED Project Credit Guidance	Army Guidance: Required - Preferred - Avoid	Project Preference Ranking: (1=most preferred, blank=no preference)	
PAR	**FEATURE**			**REMARKS**
MR6	Rapidly Renewable Materials			Relates directly to USDA FB4P biobased materials compliance. Earning this credit is highly dependent on the nature of the project and the opportunities it presents for incorporation of rapidly renewable materials.
MR7	Certified Wood			Credit is easily earned at minimal first cost in projects that include very little wood. For projects with significant wood, additional cost may be prohibitive.
CATEGORY 5 – INDOOR ENVIRONMENTAL QUALITY (15 POSSIBLE POINTS)				
EQPR1	Minimum IAQ Performance (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met. Related to compliance with 10 CFR 434 (Federal Energy Code).
EQPR2	Environmental Tobacco Smoke (ETS) Control (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met. Federal, DOD and Army policy require smoke free buildings, which meets the intent of this prerequisite. The Army currently allows an exemption to this policy for Army Family Housing, RCI housing, and individual rooms in barracks and other lodging where individuals can not be prevented from smoking. For these types of facilities, the requirements of LEED-NC 2.2 Option 3 must be met.
EQ1	Outdoor Air Delivery Monitoring			
EQ2	Increased Ventilation			May adversely effect ability to earn energy optimization credits.
EQ3.1	Construction IAQ Management Plan: During Construction	Pref		Credit is easily earned at minimal first cost.
EQ3.2	Construction IAQ Management Plan: Before Occupancy	Pref		Credit is easily earned at minimal first cost. Flushout should be prohibited where humidity/moisture introduction is an issue. Construction schedule must accommodate activities required for this credit.
EQ4.1	Low Emitting Materials: Adhesives & Sealants	Pref		Credit is easily earned at minimal first cost.

LEED 2.2 Credit Paragraph	LEED Project Credit Guidance	Army Guidance: Required - Preferred - Avoid	Project Preference Ranking: (1=most preferred, blank=no preference)	
PAR	**FEATURE**			**REMARKS**
EQ4.2	Low Emitting Materials: Paints & Coatings	Pref		Credit is easily earned at minimal first cost.
EQ4.3	Low Emitting Materials: Carpet Systems	Pref		Credit is easily earned at minimal first cost.
EQ4.4	Low Emitting Materials: Composite Wood & Agrifiber Products	Pref		Credit is easily earned at minimal first cost in projects that include very little composite wood. For projects with significant composite wood, additional cost/availability issues may be prohibitive.
EQ5	Indoor Chemical & Pollutant Source Control	Pref		Credit is easily earned at minimal first cost. Roll-up and carpet systems requiring weekly cleaning to earn this credit are not a permitted option for Army projects.
EQ6.1	Controllability of Systems: Lighting			
EQ6.2	Controllability of Systems: Thermal Comfort			Feasibility and cost of provision of individual workstation comfort controls is highly dependent on project type.
EQ7.1	Thermal Comfort: Design	Rqd		
EQ7.2	Thermal Comfort: Verification			Provider and funding of post-occupancy activities must be coordinated. Assume Government will not provide post-occupancy activities.
EQ8.1	Daylight & Views: Daylight 75% of Spaces	Pref		Credit is easily earned at minimal first cost provided building design limitations do not preclude it.
EQ8.2	Daylight & Views: Views for 90% of Spaces	Pref		Credit is easily earned at minimal first cost provided building design limitations do not preclude it.
CATEGORY 6 – FACILITY DELIVERY PROCESS (5 POSSIBLE POINTS)				
IDc1.1	Innovation in Design			
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.

Resources. Following are resources with web links, discussion of Federal and Army mandates and policies that relate to LEED, sources of design guidance and documentation tools to assist the PDT. Use of/compliance with documents indicated in this appendix is not required unless indicated in RFP. In the event of conflict between RFP and this appendix, RFP takes precedence.

Federal Mandates

Federal Energy Policy Act of 2005. Requires energy efficiency improvements in all Federal facilities, as well as metering and increased use of renewable energy sources. Requirements are synopsized in ECB 2005-20, *Energy Policy Act of 2005 (Public Law 109-58) and how it affects all Federal Facilities*. (CECW-CE-D, 08 Dec 2005) http://www.wbdg.org/ccb/ARMYCOE/COEECB/ecb_2005_20.pdf

EPA, *Environmentally Preferable Purchasing* (EPP) Program (EPA), available through URL: http://www.epa.gov/oppt/epp/ . Resulting from Executive Order [EO] 13101 *Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition* (White House, 14 September 1998), it establishes basic guidelines for EPP as well as forms the basis for Comprehensive Procurement Guidelines (see below).

Comprehensive Procurement Guidelines [CPG], www.epa.gov/cpg.

The EPA publishes the Comprehensive Procurement Guidelines (CPGs), found in 40 CFR 247, that provide a list of products that must contain recovered material. **This is required regardless of whether the LEED recycled content credit is pursued or not.** Recommendations for the percentages of recovered materials are published in a companion document titled the Recovered Materials Advisory Notice (RMAN). Additional products are added every 2-3 years. The CPGs currently include several commonly used construction products (such as concrete, floor tiles, and roofing materials) and landscaping products (such as site furnishings and landscaping timbers).
EPA requires that the purchase of products listed on the CPG contain at least the recycled content indicated in the CPG when practicable. For every project, designer must review the current CPG list and, unless designer determines that justification for non-use exists, ensure that the technical specifications require at least the recycled content indicated in the CPG. The following are considered adequate justifications for non-use:

a. The product does not meet appropriate performance standards.
b. The product is not available within a reasonable time frame.
c. The product is not available competitively (from two or more sources).
d. The product is only available at an unreasonable price (compared with a comparable non-recycled content product).

Applicable FAR provisions and clauses: FAR Part 23.4, *Use of Recovered Materials,* 52.223-4, *Recovered Material Certification,* 52.223-9, *Estimate of Percentage of Recovered Material Content for EPA-Designated Products*. Note that although EPA designated recycled content products contribute to the LEED recycled content credit, satisfying this requirement does not guarantee that the project will reach the cumulative total required to earn the LEED credit.

USDA Federal Biobased Products Preferred Procurement Program (FB4P) http://www.biobased.oce.usda.gov

The USDA has a program similar to the EPA CPG, found in 7 CFR 2902, that provides a list of designated products that must contain bio-based material with recommendations for the percentages of bio-based content. The rules for use of designated products are the same as EPA CPG. Currently the only designated construction product is roof coatings, however additional products may be added. For every project, designer must review the current USDA designations for products applicable to the project and, if any are found, unless designer determines that justification for non-use exists, ensure that the technical specifications require at least the bio-based content indicated in the designation.

All Federal contracts that involve the use or purchase of USDA- designated products must specify that the associated procurement requirements be met and must include applicable FAR provisions and clauses (currently not yet published). Note that although USDA designated bio-based content products contribute to the LEED rapidly renewable materials credit, satisfying this requirement does not guarantee that the project will reach the cumulative total required to earn the LEED credit.

FAR Part 23.803 Ozone-Depleting Substances

This federal policy requires that Federal agencies implement cost-effective programs to minimize the procurement of materials and substances that contribute to the depletion of stratospheric ozone and give preference to the procurement of alternative chemicals, products, and manufacturing processes that reduce overall risks to human health and the environment by lessening the depletion of ozone in the upper atmosphere.

Applicable FAR provisions and clauses: 52.223-11 *Ozone Depleting Substances*, 52.223-12 *Refrigeration Equipment and Air Conditioners*.

10 CFR Part 434*, Energy Code for New Federal Commercial and Multi-Family High Rise Residential Buildings*. www.wbdg.org Mandates/References, Federal Mandates, Code of Federal Regulations.

Requires federal projects comply with ASHRAE Standard 90.1, including ASHRAE Standard 62.1 – 2004, *Ventilation for Acceptable Indoor Air Quality* (ASHRAE, 2004)

10 CFR Part 435 *Energy Conservation Voluntary Performance Standards for New Buildings; Mandatory for Federal Buildings.* www.wbdg.org "Mandates/References", "Federal Mandates", "Code of Federal Regulations". Includes mandatory standards for federal residential facilities.

Department of Defense [DOD] Instruction [DODI] 1010.15, *Smoke-Free DOD Facilities Management* (Department of Defense, 02 Jan 2001). DoD implementation of EO 13058 *Protecting Federal Employees and the Public From Exposure to Tobacco Smoke in the Federal Workplace* (White House, 13 August 1997).

Army Policy and Mandates

Memorandum, DAIM-ZA, Subject: *Sustainable Management of Waste in Military Construction, Renovation, and Demolition Activities* (06 February 2006) http://www.hqda.army.mil/acsimweb/fd/docs/C&D_encl.pdf

Mandates that all new construction, renovation and demolition projects include contract performance requirements to divert as a minimum 50% of non-hazardous construction and demolition (C&D) debris from landfill disposal.

ECB 2006-7R Army Standard for Urinals (09 AUG2006) www.hnd.usace.army.mil/techinfo "Publications", "Engineering and Construction Bulletins". Mandates waterless urinals beginning FY10.

Army Energy Campaign Plan: http://hqda-energypolicy.pnl.gov/programs/plan.asp Sets forth army long-term goals and Installation activities for achieving them.

Army Installation Design Standards (Headquarters, Department of the Army, [HQDA], 3 May 2004) www.idsarmy.hqda.pentagon.mil Template and guidance for Army Installation Design Guides.

Federal Leadership in High Performance and Sustainable Buildings Memorandum of Understanding. Signatory agencies commit to federal leadership in the design, construction, and operation of High-Performance and Sustainable Buildings. A major element of this strategy is the implementation of common strategies for planning, acquiring, siting, designing, building, operating, and maintaining High Performance and Sustainable Buildings. See *Technical Guidance for Implementing the Federal Leadership in Heating Performance and Sustainable Buildings Memorandum of Understanding*, http://www.wbdg.org/sustainablemou/

United States Green Building Council/LEED

USGBC Website – http://www.usgbc.org

LEED-NC (New Construction) v.2.2 Rating System, October 2005 -- https://www.usgbc.org/ShowFile.aspx?DocumentID=1095

LEED-NC v.2.2 Registered Project Checklist -- https://www.usgbc.org/FileHandling/show_general_file.asp?DocumentID=1096

LEED-NC v.2.2 Reference Guide – Available by purchase from the USGBC at: http://www.usgbc.org/b2c/b2c/mainFS.jsp

LEED Letter Templates – Use of LEED Letter Templates for projects not registered with USGBC is a copyright infringement and is not permitted. Samples of the templates are available for review only at: http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1447. (Fully functional access to LEED On-Line is only available to projects registered with the USGBC.)

LEED Credit Interpretations (CIRs) – Available on the members only side of the USGBC website. Click 'My Account' from the USGBC main web page (log-in and look for CIRs under 'My Resources.'

LEED Application Guide for Multiple Buildings and On-Campus Building Projects https://www.usgbc.org/FileHandling/show_general_file.asp?DocumentID=1097. Provides direction in applying LEED-NC v2.1 and v2.2 to projects in a campus or multi-building setting such as corporate campuses, college campuses, and government installations (i.e. there is one owner or common property management and control).

Whole Building Design Guide (WBDG) www.wbdg.org

The WBDG is a web-based portal providing government and industry practitioners one-stop access to up-to-date information on a wide range of building-related guidance, criteria and technology from a 'whole buildings' perspective. Development of the WBDG is a collaborative effort among federal agencies, private sector companies, non-profit organizations and educational institutions. In addition to a wide range of design information, WBDG includes links to federal Executive Orders, Code of Federal Regulations and Construction Criteria Base (CCB). CCB is an electronic library of construction guide specifications, manuals, standards and many other essential criteria documents from participating federal agencies.

Whole Building Design Guide (WBDG): *Design Guidance*, http://www.wbdg.org/design/

Whole Building Design Guide (WBDG): *Tools - LEED® Version 2.1 Credit / WBDG Resource Page Matrix,* http://www.wbdg.org/tools/leed.php?a=1

WBDG, *Project Management – Project Planning & Development – Building Commissioning*, http://www.wbdg.org/project/buildingcomm.php

WBDG, *Project Management*, http://www.wbdg.org/project/index.php

WBDG, *Tools – LEED-DOD Antiterrorism Standards Tool*, http://www.wbdg.org/tools/leed_atfp_rp.php?l=ss-2

General Resources

Sustainable Design - General

Office of the Federal Environmental Executive. www.ofee.gov OFEE's mission is to advocate, coordinate, and assist environmental efforts of the federal community in waste prevention, recycling, affirmative procurement of CPG items, and the acquisition of recycled and environmentally preferable products and services. General reference with links.

Engineer Knowledge Online (EKO) Portal Sustainable Design and Development (SDD) Resource https://eko.usace.army.mil/fa/sdd/ Contains several links to SDD resources.

ERDC/CERL TR 06 1 (Draft), *Implementation of the U. S. Green Building Council's LEED® as the Army's Green Building Rating System*, January 2006 -- http://www.cecer.army.mil/techreports/ERDC-CERL-TR-06-1/ERDC-CERL-TR-06-1.pdf This work compares the SPiRiT and LEED rating systems and makes recommendations regarding further development and implementation, including the adoption of LEED® NC (New Construction) without

modification or supplement. This work also reviewed 40 sample projects to reveal patterns of successful LEED® use within the Army.

DA Pamphlet [DA PAM] 200-1, *Environmental Protection and Enhancemen*t (HQDA, 17 January 2002) www.army.mil/usapa/epubs/pdf/p200_1.pdf Provides detailed guidance to support implementation of AR 200-1 to include: water resources management, oil and hazardous substances spills, hazardous materials management, hazardous and solid waste management, air pollution, environmental noise management, asbestos management, radon reduction, pollution prevention, environmental restoration, environmental quality technology, automated environmental management systems, the Army environmental program in foreign countries, and other miscellaneous topics.

Site Development

Engineering Pamphlet 1110-1-16 [EP], *Engineering and Design—Handbook for the Preparation of Storm Water Pollution Prevention Plans for Construction Activities* (HQUSACE, 28 February 1997). www.usace.army.mil/publications/eng-pamphlets/ep1110-1-16/toc.htm

UFC 3-210-06A, *Site Planning and Design* (by reference TM 5-803-14 Site Planning and Design) (HQDA, 16 January 2004).

UFC 3-210-10, *Design: Low Impact Development Manual* (HQDA, 25 October 2004).

UFC 3-230-14A, *Evaluation Criteria Guide for Water Pollution Prevention Control and Abatement Programs* (HQDA, 16 January 2004).

Energy

DOD Instruction 4170.11, *Installation Energy Management* (DOD, 13 October 2004). http://army-energy.hqda.pentagon.mil/policies/4170_11.asp Provides procedures for DOD installation energy management and pertains to all phases of administration, planning, programming, budgeting, operations, maintenance, training and material acquisition activities that impact the supply, reliability and consumption of energy at DOD installations.

UFC 3-400-01, *Design Energy Conservation* (HQDA, 5 July 2002).

UFC 3-401-01FA, *Utility Monitoring Control Systems* (HQDA, 1 March 2005).

UFC 3-410-01FA, *Design: Heating, Ventilating, and Air Conditioning* (HQDA, 15 May 2003).

UFC 3-440-01, *Design: Active Solar Preheat Systems* (HQDA, 14 June 2002).

UFC 3-440-03N, *Design: Passive Solar Buildings* (HQDA, 16 January 2004).

UFC 3-440-04N, *Design: Solar Heating of Buildings and Domestic Hot Water* (HQDA, 16 January 2004).

UFC 3-440-06, *Cooling Buildings by Natural Ventilation* (HQDA, 16 January 2004).

UFC 4-826-10, *Refrigeration Systems for Cold Storage* (HQDA, 10 July 2002).

Materials

UFC 1-900-01, Selection of Methods for the Reduction, Reuse, and Recycling of Demolition Waste (DA, 1 December 2002).

Unified Facilities Guide Specifications (UFGS) www.wbdg.org/ccb

UFGS are non-proprietary guide specifications covering a broad range of products and systems and incorporating agency–specific guidance and many sustainability updates. They are used and maintained by USACE, NAVFAC, AFCESA and NASA.

UFGS are in the process of being updated to include Specifier notes relating to all current EPA CPG product designations, but this process is not complete yet. Designer MUST address EPA CPG requirements in specifications on a product-by-product basis.

UFGS 01 33 29 *LEED ™ Documentation.* This section includes overview and documentation requirements plus credit-specific requirements.

UFGS 01 62 35 *Recycled/Recovered Materials*. This section addresses EPA CPG compliance requirements.

UFGS 02 42 00 *Construction and Demolition Waste Management.* For DB and DBB use. This section includes requirement for waste management plan, diversion requirements and reporting.

UFGS 23 08 00.00 10 *Commissioning of HVAC Systems*. This section includes qualifications, standards and documentation, also includes several test checklists. Because it is limited to HVAC only it **does not** by itself satisfy the LEED fundamental commissioning requirement. Commissioning of other LEED required systems and coordination of documentation associated with this additional commissioning must be addressed.

USACE LEED Credit Documentation Tools

LEED 2.2 Project Checklist. USACE Project Checklist spreadsheet for LEED 2.2 is available at http://en.sas.usace.army.mil to edit to create project-specific document.

LEED 2.2 Documentation Requirements and Submittals Checklist. USACE Spreadsheet is available at http://en.sas.usace.army.mil to fill in for project submittals.

Commissioning Plan Document for LEED Fundamental Commissioning USACE template available at http://en.sas.usace.army.mil to edit to create project-specific document.

Owners Project Requirements Document for LEED Fundamental Commissioning. USACE template available at http://en.sas.usace.army.mil for Design Agent/Owner to edit to create project-specific document. Completed document should be included in DB RFPs or provided to Design Team at start of design.

Basis of Design Document for LEED Fundamental Commissioning. USACE template available at http://en.sas.usace.army.mil for Designer of Record to edit to create project-specific document.

LEED 2.2 Glazing Factor Tabulation Spreadsheet available at http://en.sas.usace.army.mil for PDT use in support of Daylighting credit

Appendix M

Owner's Project Requirements Document for LEED Fundamental Commissioning

Project: FY11 Barracks, PN64457

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
   - Primary Purpose, Program and Use
   - Project History
   - Broad Goals
2. Environmental and Sustainability Goals
   - Energy Efficiency Goals
   - General
   - Siting
   - Building Façade
   - Building Fenestration
   - Building Envelope
   - Roof
   - Other
3. Indoor Environmental Quality Requirements
   - Intended Use
   - Occupancy Schedule
   - Accommodations for After-Hours Use
   - Lighting, Temperature, Humidity, Air Quality, Ventilation, Filtration
   - Acoustics
   - Occupant Ability to Adjust System Controls
   - Types of Lighting
4. Equipment and Systems Expectations
   - Space Heating
   - Ventilation
   - Air Conditioning
   - Refrigeration
   - HVAC Controls
   - Domestic Hot Water
   - Lighting Controls
   - Daylighting Controls
   - Emergency Power
   - Other
5. Building Occupant and O&M Personnel Requirements
   - Facility Operation
   - EMCS
   - Occupant Training and Orientation
   - O&M Staff Training and Orientation

TABLE 1

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
STRATEGY TABLES

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LEED Credit Paragraph	LEED 2.2 Strategy Table	Required Points Strategy	YELLOW ITEMS: GD please fill in indicating whether site will earn these credits and return to COS. GREEN ITEMS: GD please review and confirm feasibility/revise as needed and return to COS. BLUE ITEMS: GD please highlight any added building and shared points proposed.

BUILDING: FY11 Barracks PN64457

PAR	FEATURE		REMARKS
CATEGORY 1 – SUSTAINABLE SITES			
SSPR1	Construction Activity Pollution Prevention (PREREQUISITE)	R	Preparation of Stormwater Pollution Prevent Plan (SWPPP)
SS1	Site Selection	1	No site condition that would invalidate this credit
SS2	Development Density & Community Connectivity	N/A	Buildings not located in an area with sufficient density to meet this credit or proximity to facilities
SS3	Brownfield Redevelopment		Area currently not designated as a brownfield
SS4.1	Alternative Transportation: Public Transportation Access	N/A	Public transportation not available to receive this credit
SS4.2	Alternative Transportation: Bicycle Storage & Changing Rooms	1	The UEPH will have showers and bike rakes and should be able to achieve this credit
SS4.3	Alternative Transportation: Low Emitting & Fuel Efficient Vehicles - OPTION 1		Must provide fuel efficient vehicles to 3% of occupants to meet this credit
SS4.3	Alternative Transportation: Low Emitting & Fuel Efficient Vehicles - OPTION 2	1	Must provide fuel efficient vehicle preferred parking spaces for 5% of occupants to obtain this credit
SS4.3	Alternative Transportation: Low Emitting & Fuel Efficient Vehicles - OPTION 3		Must install alternative fueling station to receive this credit.
SS4.4	Alternative Transportation: Parking Capacity		Must provide car pool parking for 5% of total parking spaces to achieve this credit
SS5.1	Site Development: Protect or Restore Habitat		Must limit site disturbance to achieve this credit
SS5.2	Site Development: Maximize Open Space	1	Must maximize open space to achieve this credit.
SS6.1	Stormwater Design: Quantity Control	1	Credits will be achieved with stormwater design
SS6.2	Stormwater Design: Quality Control	1	Credits will be achieved with stormwater design
SS7.1	Heat Island Effect: Non-Roof		
SS7.2	Heat Island Effect: Roof		
SS8	Light Pollution Reduction	1	Outside building and site lighting must be design to achieve this credit
CATEGORY 2 – WATER EFFICIENCY			
WE1.1	Water Efficient Landscaping: Reduce	1	
WE1.2	Water Efficient Landscaping: No Potable Water Use or No Irrigation	1	Temporary irrigation for plant establishment for 12 months will be provided.
WE2	Innovative Wastewater Technologies - OPTION 1		Credit can be achieved with water efficient fixtures

LEED Credit Paragraph	LEED 2.2 Strategy Table	Required Points Strategy	YELLOW ITEMS: GD please fill in indicating whether site will earn these credits and return to COS. GREEN ITEMS: GD please review and confirm feasibility/revise as needed and return to COS. BLUE ITEMS: GD please highlight any added building and shared points proposed.

BUILDING: FY11 Barracks PN64457

PAR	FEATURE		REMARKS
WE2	Innovative Wastewater Technologies - OPTION 2		Must treat 50% of wastewater on-site to tertiary standard to meet this credit
WE3.1	Water Use Reduction: 20% Reduction	1	This credit must be achieved with design
WE3.2	Water Use Reduction: 30% Reduction		This credit can be achieved with design
CATEGORY 3 – ENERGY AND ATMOSPHERE			
EAPR1	Fundamental Commissioning of the Building Energy Systems (PREREQUISITE)	R	
EAPR2	Minimum Energy Performance (PREREQUISITE)	R	
EAPR3	Fundamental Refrigerant Management (PREREQUISITE)	R	
EA1	Optimize Energy Performance	9	Federal Energy Performance requirements mandate 40% energy consumption 40% below ASHRAE 90.1 baseline.
EA2	On-Site Renewable Energy	N/A	
EA3	Enhanced Commissioning	1	
EA4	Enhanced Refrigerant Management	1	
EA5	Measurement & Verification		
EA6	Green Power	N/A	
CATEGORY 4 – MATERIALS AND RESOURCES			
MRPR1	Storage & Collection of Recyclables (PREREQUISITE)	R	
MR1.1	Building Reuse: Maintain 75% of Existing Walls, Floors & Roof		
MR1.2	Building Reuse: Maintain 95% of Existing Walls, Floors & Roof		
MR1.3	Building Reuse: Maintain 50% of Interior Non-Structural Elements		
MR2.1	Construction Waste Management: Divert 50% From Disposal	1	This credit should be obtainable by contractor
MR2.2	Construction Waste Management: Divert 75% From Disposal	1	This credit should be obtainable by contractor

LEED Credit Paragraph	LEED 2.2 Strategy Table	Required Points Strategy	YELLOW ITEMS: GD please fill in indicating whether site will earn these credits and return to COS. GREEN ITEMS: GD please review and confirm feasibility/revise as needed and return to COS. BLUE ITEMS: GD please highlight any added building and shared points proposed.

BUILDING: FY11 Barracks PN64457

PAR	FEATURE		REMARKS
MR3.1	Materials Reuse: 5%		
MR3.2	Materials Reuse: 10%		
MR4.1	Recycled Content: 10% (post-consumer + 1/2 pre-consumer)	1	This credit should be obtainable by contractor
MR4.2	Recycled Content: 20% (post-consumer + 1/2 pre-consumer)	1	This credit should be obtainable by contractor
MR5.1	Regional Materials:10% Extracted, Processed & Manufactured Regionally	1	This credit should be obtainable by contractor
MR5.2	Regional Materials:20% Extracted, Processed & Manufactured Regionally		
MR6	Rapidly Renewable Materials		
MR7	Certified Wood		
CATEGORY 5 – INDOOR ENVIRONMENTAL QUALITY			
EQPR1	Minimum IAQ Performance (PREREQUISITE)	R	
EQPR2	Environmental Tobacco Smoke (ETS) Control (PREREQUISITE)	R	Smoking is prohibited in non-residential federal facilities.
EQ1	Outdoor Air Delivery Monitoring	1	
EQ2	Increased Ventilation		
EQ3.1	Construction IAQ Management Plan: During Construction	1	
EQ3.2	Construction IAQ Management Plan: Before Occupancy	1	
EQ4.1	Low Emitting Materials: Adhesives & Sealants	1	
EQ4.2	Low Emitting Materials: Paints & Coatings	1	
EQ4.3	Low Emitting Materials: Carpet Systems	1	
EQ4.4	Low Emitting Materials: Composite Wood & Agrifiber Products	1	
EQ5	Indoor Chemical & Pollutant Source Control		
EQ6.1	Controllability of Systems: Lighting	1	

LEED Credit Paragraph	LEED 2.2 Strategy Table	Required Points Strategy	YELLOW ITEMS: GD please fill in indicating whether site will earn these credits and return to COS. GREEN ITEMS: GD please review and confirm feasibility/revise as needed and return to COS. BLUE ITEMS: GD please highlight any added building and shared points proposed.

BUILDING: FY11 Barracks PN64457

PAR	FEATURE		REMARKS
EQ6.2	Controllability of Systems: Thermal Comfort		
EQ7.1	Thermal Comfort: Design	1	
EQ7.2	Thermal Comfort: Verification		
EQ8.1	Daylight & Views: Daylight 75% of Spaces		
EQ8.2	Daylight & Views: Views for 90% of Spaces		
CATEGORY 6 – FACILITY DELIVERY PROCESS			
IDc1.1	Innovation in Design		
IDc1.2	Innovation in Design		
IDc1.3	Innovation in Design		
IDc1.4	Innovation in Design		
IDc2	LEED Accredited Professional	1	
	TOTAL	36	

APPENDIX P

LEED Registration of Army Projects

15 April 2010

Number of Registrations
Each building must be registered separately, except multiple instances of a standard building on a shared site may be registered as a single project. If a single registration for multiple buildings is chosen, all buildings under the single registration must earn exactly the same points. Do not register buildings that are exempt from a specific LEED achievement requirement.

Typical Registration Procedure
1. Login, complete the online registration form (see guidance below) at the GBCI LEED Online website http://www.gbci.org/DisplayPage.aspx?CMSPageID=174 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. GBCI will follow up with a final invoice, the LEED-online passwords and template information.
4. The individual who registers the project online is, by default, the Project Administrator.

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
Anticipated construction start and end dates
Total gross area all non-exempt buildings in registration
Total construction cost all non-exempt buildings only (see Project Details Section instructions below)

ACCOUNT/LOGIN INFORMATION
1. The person registering the project **must have an account with USGBC** (login and password) to complete the form. Go to http://www.gbci.org/ , click on “register a project” at the drop-down menu for project certification (at the top of the page) and select “register now for LEED 2009” to start the project registration process. If you have an account, login with your email address and password and select “register new project” to proceed. If you do not have an account, you may select “register a new 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 in their personal account profile (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.

ELIGIBILITY SECTION
Follow directions (accepting the terms and conditions)
Review your profile information and make corrections if needed

RATING SYSTEM SELECTION SECTION
Select single project registration and I know which rating system.
Select the rating system - currently only LEED-NC and LEED for Homes are approved for Army use without special approval.
LEED Minimum Program Requirements: select YES

RATING SYSTEM RESULTS SECTION

Confirm selected rating system.

PROJECT INFORMATION SECTION

Project Title: Begin the project title with a one-word identifier for the Installation. Do not include the word "Fort". After this match the project name used in P2 (contact the USACE Project Manager for this information) and identify the building being registered. Example: "Stewart 4th IBCT - DFAC".
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
Anticipated Construction Start and End Dates: Self-explanatory – give your best guess if unknown. Note that required data entry format is: 1 or 2 digit month/1 or 2 digit date/4 digit year (example 3/23/2010)
Gross Square Footage: Provide total area all buildings in LEED project. Exclude the area of any buildings that are exempt from the LEED achievement requirement (for example, exclude an unconditioned storage shed to be constructed with a barracks complex).
Is Project Confidential: Indicate NO except, if project has security sensitivity (elements that are FOUO or higher security), indicate YES.
Notification of Local Chapter: Indicate NO unless Government/USACE Project Manager requests you to indicate YES.
Anticipated Project Type: Select the most appropriate option from the drop-down menu.
Anticipated Certification Level: Select the applicable option from the drop-down menu (Silver is the usual level).

PROJECT OWNER INFORMATION SECTION

Project Owner First Name, Last Name, email, phone, address: The Project Owner is the USACE Project Manager. Obtain this info from the USACE Project Manager.
Organization: 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. You may supplement it with district name at the end but DO NOT revise or use an acronym.
May we publish Owner information: Indicate NO
Owner Type: Pick Federal Government from drop-down menu.
Project Owner Assertion: Check the box

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

Preliminary Submittal Register

NOTE TO SPECIFIER:

1. Appendix R" will be a Adobe Acrobat pdf version of the Specifier completed "Sample Preliminary Submittal Register." The Sample Register is Excel Spreadsheet format of the RMS Input Form 4288A, which serves two purposes.

2. First, The Register allows the both Government and the Proposers to see and estimate the cost of the Division 00 and Division 01 submittals required by the contract in addition to the Contractor generated submittal register items developed during Design After Award.

3. Secondly, after award, the Government will provide the Contractor the actual Excel Spreadsheet for the Contractor to input the data into RMS to create the Submittal Register used during contract performance. See Section 01 33 00 (Submittal Procedures), paragraph 1.8 (Submittal Register) for the contract requirements.

4. For the contract or task order Solicitation, the Specifier must complete APPENDIX R, found at the following link:
http://mrsi.usace.army.mil/rfp/Shared%20Documents/Sample%20Preliminary%20Submittal%20Register.xls , save it as a PDF file and then upload it into the Wizard as Appendix R.

5. The RMS Input Form initially includes submittals required by the standardized Model RFP Division 00 and Division 01 Sections, except Section 01 10 00, paragraph 3. Examine the Special Contract Requirements, paragraphs 3 and 6 and any other locally developed portions of the RFP for required submittals and add them to the Input Form. Do not duplicate submittals already listed in the standardized RMS Input Form, because the Contractor needs to submit this information only once.

6. After award, the Government provides the Excel spreadsheet to the selected contractor to develop and input the RMS Input form for the submittal register required by paragraph 1.8 of Section 01 33 00, Submittals.

Appendix S

Manufacturing Performance Requirements for Plumbing Fixtures From The Energy Policy Act of 1992 (PL 102-486)

Subtitle C--Appliance and Equipment Energy Efficiency Standards

SEC. 123. ENERGY CONSERVATION REQUIREMENTS FOR CERTAIN LAMPS AND PLUMBING PRODUCTS.

… (j) STANDARDS FOR SHOWERHEADS AND FAUCETS- (1) The maximum water use allowed for any showerhead manufactured after January 1, 1994, is 2.5 gallons per minute when measured at a flowing water pressure of 80 pounds per square inch. Any such showerhead shall also meet the requirements of ASME/ANSI A112.18.1M-1989, 7.4.3(a).

`(2) The maximum water use allowed for any of the following faucets manufactured after January 1, 1994, when measured at a flowing water pressure of 80 pounds per square inch, is as follows:

`Lavatory faucets: 2.5 gallons per minute

`Lavatory replacement aerators: 2.5 gallons per minute

`Kitchen faucets : 2.5 gallons per minute

`Kitchen replacement aerators: 2.5 gallons per minute

`Metering faucets: 0.25 gallons per cycle

`(k) STANDARDS FOR WATER CLOSETS AND URINALS- (1)(A) Except as provided in subparagraph (B), the maximum water use allowed in gallons per flush for any of the following water closets manufactured after January 1, 1994, is the following:

`Gravity tank-type toilets --1.6 gpf.

`Flushometer tank toilets --1.6 gpf.

`Electromechanical hydraulic toilets --1.6 gpf.

`Blowout toilets --3.5 gpf.

`(B) The maximum water use allowed for any gravity tank-type white 2-piece toilet which bears an adhesive label conspicuous upon installation consisting of the words `Commercial Use Only' manufactured after January 1, 1994, and before January 1, 1997, is 3.5 gallons per flush.

`(C) The maximum water use allowed for flushometer valve toilets, other than blowout toilets, manufactured after January 1, 1997, is 1.6 gallons per flush.

`(2) The maximum water use allowed for any urinal manufactured after January 1, 1994, is 1.0 gallon per flush.

APPENDIX AA
SPECIFICATIONS

ALL SPECIFICATIONS FOR APPENDIX AA IS PROVIDED SEPARATELY

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APPENDIX BB
BUILDING HARDENING DATA

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APPENDIX BB

BUILDING HARDENING SUPPLEMENTAL DATA

Where the conventional construction standoff distances as described in the latest UFC 4-010-01 are met, most conventional construction techniques can be used for the facilities required in this RFP. However, the Contractor should understand that some, or a portion, of the facilities to be constructed under this scope of work may not meet the conventional construction standoff distances stated in the UFC 4-010-01 and will require additional analysis and design for blast resistance.

Based on a three-story structure, blast resistance and progressive collapse requirements will be critical in the selection and design of an appropriate structural system. Heavy construction types such as reinforced concrete, reinforced masonry, and structural steel framing systems will perform better than lighter wall construction types (ex. wood-frame) which may require structural hardening to mitigate the effects of explosives.

Regardless of the construction standoff distance and/or construction type, buildings three stories or more in height must meet progressive collapse provisions of UFC 4-023-03 and windows are required to be designed according to Standard 10 (as listed in Appendix B of the UFC 4-010-01).

The “Explosive Weight” referenced by UFC 4-010-01 and the full text of UFC 4-010-02 are For Official Use only (FOUO) and cannot be provided to offerors until after contract award. The following example loads may be used for preliminary analysis of the proposed construction type and the window loading characteristics. Depending on actual standoff distance provided (between conventional construction standoff distance and minimum standoff distance), the blast load parameters will vary within the following ranges:

(a) Blast Loads: (use for dynamic analysis of walls and windows)

A normally reflected pressure, Pr and impulse, Ir (assuming triangular blast wave shape) of;

- At least Pr = 6 psi and Ir = 41 psi-msec

-But not greater than Pr = 34 psi and Ir = 82 psi-msec

(b) Window Loads: (if using ASTM methodology for design of laminated windows)

An ASTM F 2248 Equivalent 3-second Duration Design Load, DL3 of;

-At least DL3 = 50 psf

-But not greater than DL3 = 162 psf

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APPENDIX CC
JOINT BASE LEWIS-MCCHORD FIRE DEPARTMENT
REQUIRED INFORMATION

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Appendix CC – Fort Lewis Fire Department Required Information

Section 01 10 00

Additional and / or revised requirements to Paragraph 6.13 Fire Protection;

SUBJECT: Policy on Fire and Life Safety System Installation and Maintenance

1. Intent. To establish standard requirements for the installation, inspection, maintenance, repair and testing of all fire and life safety systems and equipment on Fort Lewis. All such fire systems and equipment shall conform to this standard and the following documents but is not limited to;

- Unified Facilities Criteria, UFC 3-600-01, 26 Sep. 2006
- Unified Facilities Criteria, UFC 3-600-02, 1 Jan. 2001
- National Life Safety Code, NFPA 101, 2009 edition (or most current edition)
- National Fire Alarm Code, NFPA 72, 2010 edition (or most current edition)
- National Electrical Code, NFPA 70, 2008 edition (or most current edition)
- Standard for the Installation of Sprinkler systems, NFPA 13, 2010 edition (or most current edition)
- Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height, NFPA 13R, 2010 edition (or most current edition)
- Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations, NFPA 96, 2008 edition (or most current edition)
- Standard for Portable Fire Extinguishers, NFPA 10, 2010 edition (or most current edition)

Were any conflict occurs the UFC's will take precedence over any other regulatory requirements. The most specific and/or restrictive provision shall apply if conflicts occur between the requirements found in this document, as determined by the Fort Lewis Assistant Chief of Fire Prevention (ACFP).

2. The Fire Chief is designated as the "Authority Having Jurisdiction" per FL Regulation 420-30 and authorizes the Assistant Chief of Fire Prevention to formulate Fire Prevention standards as described in NFPA, and to be responsible for their interpretation and application.

3. It is the intent of this standard to insure that fire and life safety systems and equipment are installed, inspected, tested, serviced, maintained and repaired by individuals, businesses and firms which are qualified to perform such work in accordance with these standard national codes and rulings.

4. This standard shall apply to all persons, businesses or firms engaged in installing, inspecting, testing, maintaining, or servicing fire and life safety systems and equipment.

Exceptions:

a. Employees of the Federal Government engaged in installing, inspecting, testing, maintaining or servicing fire and life safety systems and equipment.

b. For aircraft vehicles, any businesses, firms or persons engaged exclusively in the business of installing, inspecting, testing, maintaining or servicing fire and life safety equipment on such aircraft and vehicles.

5. No person shall engage in the business of installing, servicing, inspecting, testing or maintaining fire and life safety systems and equipment unless they have obtained a certificate of fitness by application from the ACFP. Certificates shall remain valid for a period of time not to exceed three (3) years, or the minimum time left on their qualification documents (see application form) and unless suspended or revoked by the chief.

6. Certificates or licenses issued by the State Fire Marshal, other locally recognized or similar authorities, provided such certificates establish qualifications of the holder in a manner similar to this standard and to the satisfaction of the ACFP, will be recognized.

7. A list shall be maintained of all persons who have applied for or received a certification together with records.

8. Qualification for certificates applicants shall provide evidence that they have completed any combination of training, certifications, and minimum five years work experience on multi-type alarm systems and occupancies in a resume format to be accepted in writing by the Fire Chief. Acceptable proof of competence shall be any one of the following:

- A valid State of Washington Professional Electrical or Fire Protection Engineer's License
- A valid NICET Level II or higher Certification for Fire Alarm Systems
- Underwriters Laboratories Inc., Certificate Of Compliance
- Certificate of Training from the manufacturer, for equipment being serviced or installed.
- Certificates or licenses issued by the State Fire Marshal, local state fire departments or similar authorities
- Fire Sprinkler Certificate of Competency, licensed by Washington State Fire Marshal's Office

9. Applicants shall submit evidence that they possess necessary tools and test equipment (i.e. Gemini tester, Truetest Sensitivity Tester) by equipment, model, serial number and date of last calibration required for the type of work to be performed.

10. Acceptance, maintenance testing and inspection forms shall be completed and signed with floor plan, Input/Output matrix by personnel performing either task. Documents will be submitted to the Chief of Fire Prevention or his representative digitally by disk in acceptable formats. Facilities that are occupied when scheduled maintenance or alteration are completed will be furnished a performance verification letter ensuring the occupants of the operational integrity of the system. (ref. NFPA 72, Figure 10.6.2.3 & A Figure 10.6.2.3)

11. A service label shall be securely attached to each fire and life safety system or item of fire and life safety equipment at the time of service or maintenance. The following information shall be printed on services label:

a. Name of business or firm
b. Address
c. Telephone
d. Date work was performed
e. Date battery was installed and date of manufacture (if applicable)
f. Description of work performed
g. Signature of person performing work

12. The Asst. Chief of Fire Prevention or his/her representative may refuse to issue, renew or may suspend or revoke any certificate if he/she determines that an applicant for or holder of a certificate has:

a. Obtained or attempted to obtain a certificate by fraud or misrepresentation
b. Installed, maintained, or serviced systems or equipment in violation of adopted standards
c. Applicant for certificate does not possess the qualifications to conduct the operation for which application is made
d. Complaints of compliance by this office or other installation agencies

13. Additional Requirements: Metal, weather resistant signs shall have a white background with red letters and shall be affixed for the following: 1) "Fire Department Connection" (20x15 letters) 2) "Gas Cut-Off" (20x15 letters) 3) "BFP test valve" (20x15 letters) 4) "FP test valve" (20x 15 letters) 5) Fire alarm panel equipment room door signage. "Fire Alarm"(16 x 2 letters) 6) Fire suppression sprinkler riser room door signage. "Sprinkler Riser" (16 x 2 letters) 8 feet above grade. Conspicuous sign(s) shall be posted directing the Fire Department to all Fire Protection equipment. If FDC and/or PIV is located away from facility, building number will be stenciled/labeled with reflective white 2 inch numbers and valves will be painted red.

a. Bollards or chains used to control POV access on to fire department access will be padlocked and keyed Best 750.

b. Contractor will install "Rapid Entry Box" on left side, within six (6) feet of main entrance door Model: SupraSafe 2HSR or Suprasafe1 Key Type: Titan Code: C4733(Fort Lewis) McChord Field will use Knox Rapid Entry System. Contact Chief Sandra Cooper.

c. Barracks /Installing smoke detectors in the kitchen areas of living modules - Install smoke alarms with delays (30-40 second activation time delay allowing the smoke alarm to clear before panel activation or local nuisance alarm).

d. Locations of controls- All components of the fire alarm panel, transmitter, sprinkler system risers shall be installed at a convenient location for maintenance, inspection and testing acceptable to the authority having jurisdiction. Components will not be installed above 6ft on wall and a 36 inch clearance must be maintained around components. Minimum 36 inch clearance must be maintained around FDC, Backflow Preventer, Fire Pump test ports/valves.

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APPENDIX DD
DEMOLITION SCOPE OF WORK

**ALL DEMOLITION SCOPE OF WORK FILES FOR APPENDIX DD IS PROVIDED SEPARATELY **

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APPENDIX EE
REVISIONS TO 01 10 00
PN 64457 FY11 UEPH

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The following changes apply to Technical Specifications Section 01 10 00:

Section 2.2 Site:

Revise to read:

2.2.1 UEPH Site and Courtyard

Provide all site improvements necessary to support the new building facilities located within the UEPH D/B construction limits included in Appendix J. Supporting facilities include, but are not limited to, utilities, electric service, telecommunications, exterior and security lighting, fire protections and alarm systems, water, gas, hot water heating supply, sewer, courtyard landscaping and furnishings and other site improvements. Antiterrorism/force protection measures shall also be included in the facility design in accordance with applicable criteria.

Add:

2.2.2. BUILDING DEMOLITION: Refer to Appendix DD for building demolition scope of work.

2.2.3. POV SITE:

Provide all construction of the POV parking and access drives with associated site located within the UEPH and Site Construction Limits as shown on the drawings in Appendix C and included in the specifications in Appendix AA.

Section 3.4.3.1 Exterior Walls:

Add:
It is recommended that a Rain-Screen type system be employed at all locations where metal panels are utilized on the exterior walls.

Section 3.4.4.2 Bulletin Boards:

Replace 1st sentence with:
Provide one bulletin board in each common area on the first floor.

Section 3.8.1.2 Laundry room lighting

Remove section 3.8.1.2 in its entirety:

Section 4.2.11.1

Remove section 4.2.11.1 in its entirety. There is no requirement for SIPRNet or a protective distribution system (PDS) in Barracks.

Section 6.8. Plumbing

Add:
Low-flow urinals (0.5 gpf) meeting ASHRAE 189.1.

Section 6.10.2.3.(b)

Add:
Army administrative outlets are only required at the duty desk. Army telephones are required in utility spaces, including electrical, mechanical, and telcom rooms. Army fiber is required for the DDC system connections for input to the base EMCS.

Section 6.10.2.6

Remove section 6.10.2.6 in its entirety. There is no requirement for a PDS in Barracks

Section 6.10.2.8

Remove section 6.10.2.8 in its entirety. There is no requirement for an antenna in Barracks.

Section 6.10.3

Remove section 6.10.3 in its entirety. There is no requirement for Intrusion Detection in Barracks

Section 6.11.1 HEATING, VENTILATING AND AIR CONDITIONING

Add:
6.11.1.(a) The barracks facilities in the East Division Area shall be heated using the existing District existing hot water supply system. The supply and return lines are currently being upgraded in this area. Coordinate locations and invert elevations of connections with DPW.

Section 6.11.4.3.

Add:

Heat recovery units shall disable or by-pass the air to air heat exchanger whenever the outside air temperature is higher than the indoor space temperature.

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