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CORRECTED FINAL/RTA  
REQUEST FOR PROPOSAL  
W912DW-09-T-5400

**864<sup>th</sup> ENGINEERING BATTALION SMALL TACTICAL  
EQUIPMENT MAINTENANCE FACILITY (TEMF)  
PN 069167, FY 2009**

JOINT BASE LEWIS-McCHORD, WASHINGTON

Design-Build Construction Solicitation and  
Specifications

U.S. ARMY CORPS OF ENGINEERS  
Seattle District

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**SECTION 01 10 00.0002**  
**TASK ORDER STATEMENT OF WORK**

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## 1.0 PROJECT OBJECTIVES

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
Tactical Equipment Maintenance Facility (TEMF)	Heavy Equipment/Vehicle Maintenance Garage

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

The project site should be developed for efficiency and to convey a sense of unity or connectivity with the adjacent buildings and with the Installation as a whole.

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 lowest 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. TACTICAL EQUIPMENT MAINTENANCE FACILITY (TEMF)

Provide Tactical Equipment Maintenance Facilities. This project type is to provide facilities for the purpose of maintaining and repairing vehicles, complete with equipment and parts storage and administrative offices. It is intended to be similar to heavy equipment or motor pool facilities in the private sector community. Assume 12 percent of personnel are female unless otherwise indicated.

The project will include TEMFs for 1 battalion(s). Specific sizing parameters for each battalion TEMF included in the project are as follows:

864th Engineering Battalion

TEMF size: Small

A 10-ton bridge crane is required in this TEMF.

Number of organizational vehicles to be accommodated: 135

Organizational vehicle hardstand: 15,500 square yards

Organizational storage building: 2,800 square feet

POL storage building: 131 square feet

Hazardous waste storage building: 131 square feet

Distribution company storage building, 8000 SF w/445 SY Secure Storage, NOT required

UAV maintenance and storage, 1800SF, NOT required

POL vehicle parking NOT required

The maximum gross area for the primary Tactical Equipment Maintenance Facilities (excluding site storage buildings) in the project is limited to 18,000 SF.

## 2.2. SITE:

Provide all site design and construction within the TEMF limits of construction necessary to support the new building facilities. Supporting facilities include, but are not limited to, utilities, electric service, exterior and security lighting, fire protection and alarm systems, security fencing and gates, water, gas, sewer, oil water separators, storm drainage and site improvements. Provide accessibility for individuals with disabilities. Include Antiterrorism/Force Protection measures in the facility design in accordance with applicable criteria.

Maintain the construction site and haul route. Repair/replace damage to existing sidewalks, pavements, curb and gutter, utilities, and/or landscaping within the construction limit, adjacent to the construction site, and along the Contractor's haul route resulting from the Contractor's construction activities at no additional cost to the Government. Prior to construction activities, Contractor and Contracting Officer Representative shall perform an existing condition survey. At completion of the Task Order, Contractor and Contracting Officer representative shall perform a final condition survey to determine repair/replacement requirements.

Approximate area available for this (these) facility(ies) is shown on the drawings.

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

Approximate area available 9.00 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: No additional requirements.

## 2.4. FURNITURE REQUIREMENTS

Provide furniture design for all spaces listed in Chapter 3 and including any existing furniture and equipment to be re-used. Coordinate with the user to define requirements for furniture systems, movable furniture, storage systems, equipment, any existing items to be reused, etc. Early coordination of furniture design is required for a complete and usable facility.

The procurement and installation of furniture is NOT included in this contract. Furniture will be provided and installed under a separate furniture vendor/installer contract. The general contractor shall accommodate that effort with allowance for entry of the furniture vendor/installer onto this project site at the appropriate time to permit completion of the furniture installation for a complete and usable facility to coincide with the Beneficial Occupancy Date (BOD) of this project. The furniture vendor/installer contract will include all electrical pre-wiring and the whips for final connection to the building electrical systems however; the general contractor shall make the final connections to the building electrical systems under this contract. Furthermore, the general contractor shall provide all Information/Technology (IT) wiring (i.e. LAN, phone, etc.) up to and including the face plate of all freestanding and/or systems furniture desk tops as applicable, the services to install the cable and face plates in the furniture, the coordination with the furniture vendor/installer to accomplish the installation at the appropriate time, and all the final IT connections to the building systems under this contract.

The Government reserves the right to change the method for procurement of and installation of furniture to Contractor Furnished/Contractor Installed (CF/CI). CF/CI furniture will require competitive open market procurement by the Contractor using the Furniture, Fixtures and Equipment (FF&E) package.

## 2.5. NOT USED

### 3.0 TACTICAL EQUIPMENT MAINTENANCE FACILITY (TEMF)

#### 3.1. GENERAL

- (1) **Functional Areas.** The primary TEMF is composed of two main types of functional areas: Repair Bays (consisting of Repair areas and Maintenance areas), and the Core Area. Refer to the attached Floor Plans for recommended layout.
- (2) **Gross Building Area.** Gross areas of facilities shall be computed according to subparagraphs below. Maximum gross area limits indicated in Paragraph 2.0, SCOPE, may not be exceeded. A smaller overall gross area is permissible if all established net area program requirements are met.
  - (a) **Enclosed Spaces.** The gross area includes the total area of all floors, including basements, mezzanines, penthouses, usable attic or sloping spaces used to accommodate mechanical equipment or for storage with an average height of 6'-11" measured from the underside of the structural system and with the perimeter walls measuring a minimum of 4'-11" in height, and other enclosed spaces as determined by the effective outside dimensions of the building.
  - (b) **One-Half Spaces.** One half of the area will be included in the gross area for balconies and porches; exterior covered loading platforms or facilities, either depressed, ground level, or raised; covered but not enclosed passageways or walks; covered and uncovered but open stairs; and covered ramps.
  - (c) **Excluded Spaces.** Crawl spaces; exterior uncovered loading platforms or facilities, either depressed, ground level, or raised; exterior insulation applied to existing buildings; open courtyards; open paved terraces; roof overhangs and soffits for weather protection; uncovered ramps; uncovered stoops; and utility tunnels and raceways will be excluded from the gross area.
- (3) **Net Area.** Net area requirements for functional spaces are included in the drawings. If net area requirements are not indicated, the space shall be sized to accommodate the required function, comply with code requirements, comply with overall gross area limitations and other requirements of the RFP (for example, area requirements for corridors, stairs, and mechanical rooms will typically be left to the discretion of the Offeror).
- (4) **Deviations and Improvements.** It is the intent of this document to allow deviations and improvements to the design shown.
- (5) **Handicapped Access.** All TEMF buildings are to be handicapped accessible.
- (6) **Site Design and Functional Areas.** Site features include vehicular hardstand, utilities and site improvements.
- (7) **Adapt-Build Model.** An Adapt-Build Model for a TEMF, which contains a fully developed design, including a Building Information Model (BIM), 2-D CADD files, and specifications, can be downloaded from the following FTP site: <ftp://ftp.usace.army.mil/pub/sas/TEMF/>. This design is provided as a guide that exemplifies a technically suitable product and incorporates mandatory functional/operational requirements for a similar (although perhaps not an exact) facility to be constructed under this solicitation. It will be left to the offerors' discretion if, and how, they will use the sample design provided to satisfy the requirements of this Request for Proposal. This model is not intended to modify or over-ride specific requirements of this RFP and, under all circumstances, it will be incumbent upon the successful offeror to adhere to the site specific scope and functional/operational requirements specified within the RFP. Neither this statement of work, nor the adapt-build model, are intended to diminish the offeror's responsibilities under the clauses titled "Responsibility of the Contractor for Design," "Warranty of Design," and "Construction Role During Design." The successful offeror shall be the designer-of-record and shall be responsible for the final design and construction product, including but not limited to, adherence to the installation architectural theme, building code compliance and suitability of the engineering systems provided. The government assumes no liability for the model design provided and, to the extent it is used by an offeror, the offeror will be responsible for all aspects of the design as designer-of-record.

##### 3.1.1. Repair Areas and Vehicle Corridor/Maintenance Areas

Repair areas and maintenance areas are garage areas used for service and repair of the full range of Army tactical equipment. They are single story ground floor spaces. A typical structural bay to accommodate both repair and maintenance areas is sized to measure 32' x 96'. Conceptually, this structural bay contains four 16' x 32' repair work areas, and a 32' wide vehicle corridor dividing them crosswise. The vehicle corridor also serves as a maintenance area. It accommodates 16' x 32' maintenance work areas down the length of the entire building .

Two contiguous work areas may be required to accommodate work on larger equipment, thus resulting in the need for work areas to be constructed in pairs. Repair and maintenance areas are to be free of intermediate support columns, i.e. columns are only permissible along exterior perimeter walls. This allows complete shop floor coverage by a single bridge crane for all contiguous maintenance and repair areas (each wing of the facility). TEMFs requiring four structural bays or less shall be constructed contiguously in a single wing of the facility.

(1) Repair Areas

(a) Function. Repair of vehicles as described above. Structural height shall be as required to allow minimum bridge crane hook cradle height of 20 feet (minimum of 25 feet for bays with 35-ton bridge cranes). Overhead coiling doors, 24'-0" wide x 14'-0" high, shall be provided at each end of each structural bay.

(b) Equipment. Repair Bays shall be served by a 10-ton or a 35-ton capacity traveling bridge crane with full structural bay coverage as indicated in the Architectural TEMF Features Matrix and as specified in Para. 2.1. Additional requirements are specified in the paragraph ARCHITECTURE.

(c) Provide one hose bibb and two compressed air outlets 3'-0" above the floor for each pair of repair areas.

(d) Welding/Machine Shop Area: Provide special purpose repair space to support machine shop equipment and power connectivity for portable welding equipment within one pair of repair areas, typically in repair bay farthest from the Core Area. This area will not be used exclusively for welding. It may be utilized as a repair area also and shall be equipped with all requirements for repair areas except items (e), and (j).

(e) Provide utilities for component washing and vehicle spot washing in the outermost work area of each wing of repair/maintenance areas. Provide a 5'-4" high concrete masonry wall separating the outermost bay from others to contain spray resulting from engine and component wash functions. Terminate partition to provide 6'-0" clear space at each end of the partition.

(f) In each pair of repair areas, provide electric power for user provided (GFGI) portable hydraulic lift.

(g) Provide continuous 6-inch wide trench drains with continuous grating along full width of bays at exterior doors; locate drains approximately 3'-0" inside face of exterior walls. In addition to the outside trench drains, a center trench drain running the full width of the bays is permissible to facilitate internal drainage of the facility. When a dedicated, partitioned welding area is provided, provide a solid cover to trench drain where it runs through the welding area.

(h) Each work area shall have access to NIPRNet -data connection points.

(i) Provide an outlet to a vehicle exhaust evacuation system for each repair area.

(j) Tire Changing Area: Provide capability for tire changing function where shown on the TEMF Standard Drawings. Tire changing equipment shall be GFGI."

(2) Vehicle Corridor/Maintenance Areas

(a) Function. Maintenance of vehicles as described above. Maintenance areas within core area shall be equipped for inspection, oil changing and lubrication. All requirements listed above, except items (d), (e), (f), and (j) apply to the maintenance areas.

(b) Maintenance Area within the High Bay Portion of Facility. Access to compressed air, water, vehicle exhaust, power and data in the maintenance areas within high bay portion of facility shall be via connections along the nearest wall.

(c) Maintenance Area within the Core Area. Maintenance areas within the core area shall be equipped for inspection, oil changing and lubrication. The minimum clear ceiling height shall be 14'-0" Above Finished Floor. Provide an outlet to a vehicle exhaust evacuation system for each pair of maintenance areas. Bridge crane access is not required for maintenance areas along central vehicle corridor in the core area.

(1) Maintenance Pit. Provide one 40-foot long x 3'-6" wide concrete maintenance pit in the central vehicle corridor portion maintenance area within the core with stair access. Due to inside clearance for some vehicles, the maximum 3'-6" width is critical for the pit and curbing. Pit shall have non-sparking, non-slip removable floor grating approximately 4'-4" below finish floor elevation, with concrete pit floor below sloping to sump. Provide sump pump, see Paragraph 3.1.8(4) Plumbing for additional information. Provide compressed air outlet at two places in the pit. When not in use, pit shall be provided with removable cover capable of supporting pedestrian traffic. Provide minimum 4-inch high steel angle curb surrounding pit opening. Pit cover panels to be light enough to be handled by a maximum of two personnel.

- (2) POL Hose Reels. Provide two POL dispensing points mounted to the wall of the maintenance area. They should be spaced along the length of the pit. Hose and reel assembly shall be heavy duty, designed for the applicable fluid or oil. Provide shutoff valve at reel. Provide distribution for grease, engine oil, gear oil, transmission fluid, and antifreeze.
- (3) Circulation Bays
- (a) Provide an 8' wide x 96' long structural bay between each wing of repair bays and the core area to facilitate pedestrian egress from the building and shall conform to OSHA requirements.
- (b) Equipment. Provide 4'-0" high x 8'-0" wide framed tack board (for 'safety board') mounted on wall along the circulation bay near the tool room. Provide one permanently installed emergency eyewash, hand held drench hose and shower station at each circulation bay that is adjacent to a core area and provide additional emergency eye wash, hand held drench hose and shower stations in other bays as required per OSHA standard 1910.151(c) and ANSI Z358.1. Provide one or more emergency eyewash, hand held drench hose and shower stations in Consolidated Bench Repair when the equipment being serviced or solvents being used generate this requirement. Locate emergency wash stations in accordance with OSHA standard 1910.151(c) and ANSI Z358.1. Per OSHA 1910.151(c) emergency eyewash/shower units should be located such that a worker can reach one in 10 seconds. ANSI Z358.1 gives a guideline of 55 feet to meet this requirement.

### 3.1.2. Core Areas:

Core areas are arranged in one and two story configurations (refer to the attached floor plans for standard layouts). Internal walls within the core should be non-load bearing to the extent possible to allow future rearrangement of spaces.

- (1) Administration and Shop Control. Office space to accommodate foremen, production control, and clerical personnel. Provide one space per core; may be located on first or second floor but shall be accessible to the physically disabled. Provide counter and pass-through window between this room and the customer Waiting Area; size pass-through window to accommodate transfer of 30-inch by 30-inch items, and layout the area outside window so that two people can stand at the window and be out of the corridor traffic pattern. Provide viewing windows from administration and shop control space into the repair areas.
- (2) Training Room. The training room space is intended to facilitate the training mission for maintenance personnel. This space is to be divided into two training areas with an operable folding partition (movable wall) having a sound isolation of STC 45, minimum. Provision shall be made to accommodate up to 30 students for computer based training, including power and data connections for each student.
- (3) Consolidated Bench. Shop space for unit-level maintenance of electronics, optics, and other gear. Locate on first floor.
- (a) Equipment. Provide an overhead coiling door 10'-0" wide x 10'-0" high.
- (b) Furnishings/Fixtures. See Table 7 for furnishings. Provide capabilities shown in the features matrix for each work space.
- (c) Provide operable exterior windows. Provide at least one window with clear view and unobstructed line of sight out of the building to a minimum of 800 feet for testing weapon sights.
- (4) Tool Room. Designated space for the issue and secure storage of unit common tool kits, as well as supplemental tool kits and individual tools shared by shop personnel. Direct covered access from the tool room to the SATS containers (described below) on the exterior of the building is required. Provide lockable pair of personnel doors and pass-through opening with impact resistant counter and metal overhead lockable coiling shutter between Tool Room and Corridor.
- (a) Standard Automotive Tool Set (SATS). The SATS is a unit-owned (i.e. GF/GI) containerized tool system with the dimensions of 8' x 20' x 8' high. An exterior hardstand storage area adjacent to the Tool Room shall be provided for three SATS containers. Connectivity to building and installation network is required. SATS are accessed from the end. Provide wall mounted awning with minimum 14-foot clear height above hardstand for weather protected entry into SATS containers. The technical manual for SATS is TM 9-4910-783-13&P.
- (5) Tool Box Storage. Provide one Tool Box Storage Room for each wing of Repair Areas (if Repair Areas are located on both sides of a core, each side of core shall have a Tool Box Storage Room). Tool Box Storage is provided for personnel working inside the maintenance complex in the Repair Areas and the Consolidated Bench

for the storage of individually assigned or personal (Contractor) tools requiring security. Provide lockable personnel door with closer between Tool Box Storage and Circulation Bay.

(6) Combat Spares. Storage and issue of Prescribed Load List (PLL) and shop stock items kept in stock at all times because of demand or management decisions. Direct covered access from the Combat Spares room to the ASL-MS containers (described below) on the exterior of the building is required. Provide lockable pair of personnel doors so to accommodate 48" x 48" x 74" ASL-MS repair parts bins and shelving modules, and pass-through opening with impact resistant counter and overhead lockable coiling shutter between Combat Spares and Corridor.

(a) Authorized Stockage List - Mobility System (ASL-MS). Similar to the SATS, the ASL-MS is a unit-owned (i.e. GF/GI) 8' x 20' x 8' high container for repair parts. An exterior hardstand storage area adjacent to the Combat Spares room shall be provided for three ASL-MS containers. ASL-MS are accessed from the side. Provide sufficient aisles between ASL-MS for access. Provide wall mounted awning with minimum 14-foot clear height above hardstand for weather protected entry into ASL-MS containers. Provide lockable pair of personnel doors at building exterior to accommodate large bulk portable tools and equipment, and ASLMS repair parts modules. The technical manual for ASL-MS is TM 9-5411-236-13&P.

(7) Latrine, Shower and Locker Rooms

(a) Latrines. Provide separate latrines for men and women on each floor. Provide water closets, urinals, lavatories and drinking fountains in accordance with established layouts and referenced codes.

(b) Shower and Locker Rooms. Provide a Men's Shower and Locker Room and Women's Shower and Locker Room. Locate on first floor of each core, sized to accommodate the number of lockers and showers indicated. Shower and locker area shall be adjacent to and connect to the latrine area. Provide individual shower compartments (3'-0" x 3'-0") in the number indicated on the drawings. Provide a single tier steel locker for each non-administrational occupant of the building, minimum size 1'-0" wide x 1'-6" deep x 6'-0" high.

(8) Break, Training, and Conference (BTC). Locate this room on same floor as Admin and Shop Control.

(a) Furnishings. Provide kitchen, base and wall cabinets and 30-inch deep countertop minimum 10'-0" long.

(b) Equipment. Provide stainless steel two-compartment sink.

(c) Allow space and hookups for vending machines, refrigerator and microwave.

(9) Vaults. All vault walls, floors and ceilings shall be constructed in compliance with appropriate requirements referenced below. Provision for a user provided (GFGI) intrusion detection system including motion detectors, door alarm, and camera, is required.

(a) Weapons Storage Vault. Provide secure storage of weapons being repaired, especially vehicle-mounted weapons such as machine guns and firing port weapons. Weapons vault walls, floors and ceilings shall be constructed in compliance with AR 190-11, Physical Security of Arms, Ammunition, and Explosives. An option exists for use of prefabricated, modular vaults conforming to Fed. Spec. AA-V-2737 requirements. Provide a GSA-approved Class 5 Armory vault door with lock in accordance with Fed. Spec. AA-D-600D and a "Dutch door" style day gate. Provide an internal wire mesh partitioned space or provide space for GFGI lockable cabinets IAW installation requirements to accommodate armorer's tool kits, spare arms parts, machine gun barrels and major subassemblies. Coordinate arms rack anchor rings, common storage racks, etc with user.

(b) COMSEC Vault. Provide secure storage of communications/cryptology equipment. Room must have a minimum 8-foot dimension. Refer to Physical Security Standards of Appendix D of AR 380-40, Policy for Safeguarding and Controlling Communications Security (COMSEC) Material (FOUO).

(10) Nonsensitive Secure Storage. Nonsensitive Secure Storage shall be constructed to meet Secure Storage standards for Risk Level II per AR 190-51, Security of Unclassified Army Property.

(11) Telecommunications- Room-. Telecommunications rooms shall be provided for voice and data. There shall be a minimum of one room on each floor, located as near the center of the building as practicable, and stacked between floors. The telecommunications rooms shall be designed in accordance with the Technical Criteria for Installation Infrastructure Architecture I3A Criteria and ANSI/EIA/TIA-569-B. SIPRNET Room shall also be provided for future SIPRNet connectivity in accordance with the Technical Guide for the Integration of Secret Internet Protocol Router Network (SIPRNet).

(12) Non-Assignable Spaces and Gross Area. The items below account for additional gross area within the core that is not specifically listed in the spaces above. These items may also vary in size contingent on site, climate, type and use.

- (a) Stairwells. Design in accordance with model and local building codes.
- (b) Elevator. Provide one passenger elevator in each two-story building. Elevator machine room is also part of the gross area of the core.
- (c) Common Circulation Corridors. All circulation corridors shall be a minimum of 6 feet wide.
- (d) Waiting Area. Locate adjacent to Admin and Shop Control pass-through window off of corridor. Size Waiting Area for the seating of a minimum of four persons.
- (e) Janitorial Spaces. Provide one janitorial space as shown on drawings with mop sink and heavy duty shelving. Expansion of the Janitorial Space to include a recycling function is optional.
- (f) Mechanical Rooms. Utility space must be provided for heating and cooling equipment. Where feasible, vertically stack like utility spaces if located on two floors. Locate first floor mechanical rooms adjacent to exterior walls for external maintenance access and ventilation. See paragraph 3.1.7 Heating, Ventilation, and Air Conditioning (HVAC) Systems, for additional requirement. Walls and floor/ceiling assemblies enclosing mechanical room shall have a sound transmission class (STC) rating of not less than 50 (45 if field tested) for air-borne noise when tested in accordance with ASTM E 90, and an impact insulation class (IIC) rating of 50 (45 if field tested) when tested in accordance with ASTM E 492.
- (g) Electrical Rooms. Locate first floor electrical rooms adjacent to exterior walls for external maintenance access and ventilation.
- (h) Fluid Distribution Room. Provide a room to house the POL central distribution equipment and unused POL storage containers (typically 55-gallon drums) for five types of lubricants/fluids. Fluids shall be dispensed by automotive lubricant type air driven pump assemblies. Motor shall be heavy-duty compressed air driven reciprocating action. For antifreeze unit all parts shall be corrosion resistant. Locate near maintenance pit to minimize length of fluid distribution lines. Compliance with UFC 3-600-01, NFPA 30, and 29 CFR 1910.106 is mandatory. Provide secondary containment in compliance with applicable federal and state environmental regulations. Square footage for this space is part of the gross area for the core.

### 3.1.3. Site Functional Area

- (1) Dock. Provide one docking location for maintenance and electronic testing of specialized, permanently vehicle mounted, communications equipment. Provide equipment power connections and grounding points for vehicle degauss and individual personnel static discharge protection of equipment.
- (2) Organizational Vehicle Hardstand. This area consists of a rigid concrete paved area used for parking assigned vehicles (wheeled and heavy and tracked), commercial vehicles (Contractor support), trailers and generators. Organizational vehicle hardstand includes building aprons, parking spaces, and circulation lanes on site.
  - (a) Tactical/Military and Commercial Vehicle Parking. Maximize vehicle parking and traffic flow to best support the operation of the TEMF.
  - (b) POL Vehicle Parking Area. Not required.
  - (c) Dead Line Vehicle Parking. Parking for vehicles waiting for parts or for work to be performed. One dead line parking space for every pair of repair areas and shall be located in parking areas adjacent to repair bays that will service them.
  - (d) Building Aprons. Provide concrete pavement for aprons associated with each of the facilities located in the maintenance complex.
- (3) Site Storage
  - (a) Hazardous Waste Storage Building. Provide a building with solid walls and roof. It is used to temporarily store used lubricants, flammable solvents, dry sweep, etc. A unit is authorized 60 square feet for each 25 vehicles, or part thereof, which it maintains. A minimum of 120 square feet of hazardous waste storage space will be provided. The specific requirement for this project is specified in Para. 2.1. Provide secondary containment in compliance with applicable federal and state environmental regulations. Compliance with UFC 3-600-01, NFPA 30, and 29 CFR 1910.106 is mandatory. Maintain minimum separation distance from other buildings in accordance with the IBC in order to eliminate the need for automatic sprinkler protection. Pre-fabricated, fire-rated, self-contained, moveable steel safety storage buildings are permitted as an option. Minimum size of 120 SF per container, though multiple containers may add up to the total quantity required per satellite accumulation area.

(b) POL Storage Building. Provide a building for the storage of oil, lubricants, and flammable solvents for daily use. A unit is authorized 60 square feet for each 25 vehicles, or part thereof, which it maintains. A minimum of 120 square feet of oil storage space will be provided. The specific requirement for this project is specified in Para. 2.1. Provide an access apron at the entry of this building. Provide secondary containment in compliance with applicable federal and state environmental regulations. Compliance with UFC 3-600-01, NFPA 30, and 29 CFR 1910.106 is mandatory. Maintain minimum separation distance from other buildings in accordance with the IBC and local codes in order to eliminate the need for automatic sprinkler protection. Pre-fabricated, fire-rated, self-contained, moveable steel safety storage buildings are permitted as an option. Minimum size of 120 SF per container, though multiple containers may add up to the total quantity required per satellite accumulation area.

(c) Organizational Storage Building. This building is for storage of deployment equipment. The size of this facility is determined by the organizational structure and the number of organizational vehicles; specific to each project. Provide a 10' x 10' coiling door and a personnel door for each 700 SF of company supply area along one side of building. Provide internal wire or secure partitions between each 700 SF space. Floor area of building shall be as specified in the project scope of work. Building shall be approximately 25 feet deep. The floor system of this facility should be designed for fork-lift lifting.

(d) Distribution Company Storage Facility. Not required

(e) Secure Open Storage. Not required

(f) UAV Maintenance and Storage Building. Not required

(g) Used Oil Storage Tank(s). Provide one 500-gallon above-ground used engine oil storage tank at the end of the Repair Areas. Tank shall be constructed of non-corrosive material. Provide secondary containment in compliance with applicable federal and state environmental regulations. Tank construction and location shall comply with IBC requirements. Recommended location is adjacent to the end repair area. Used oil, waste fuel, and used engine coolant storage tanks should be co-located, if possible.

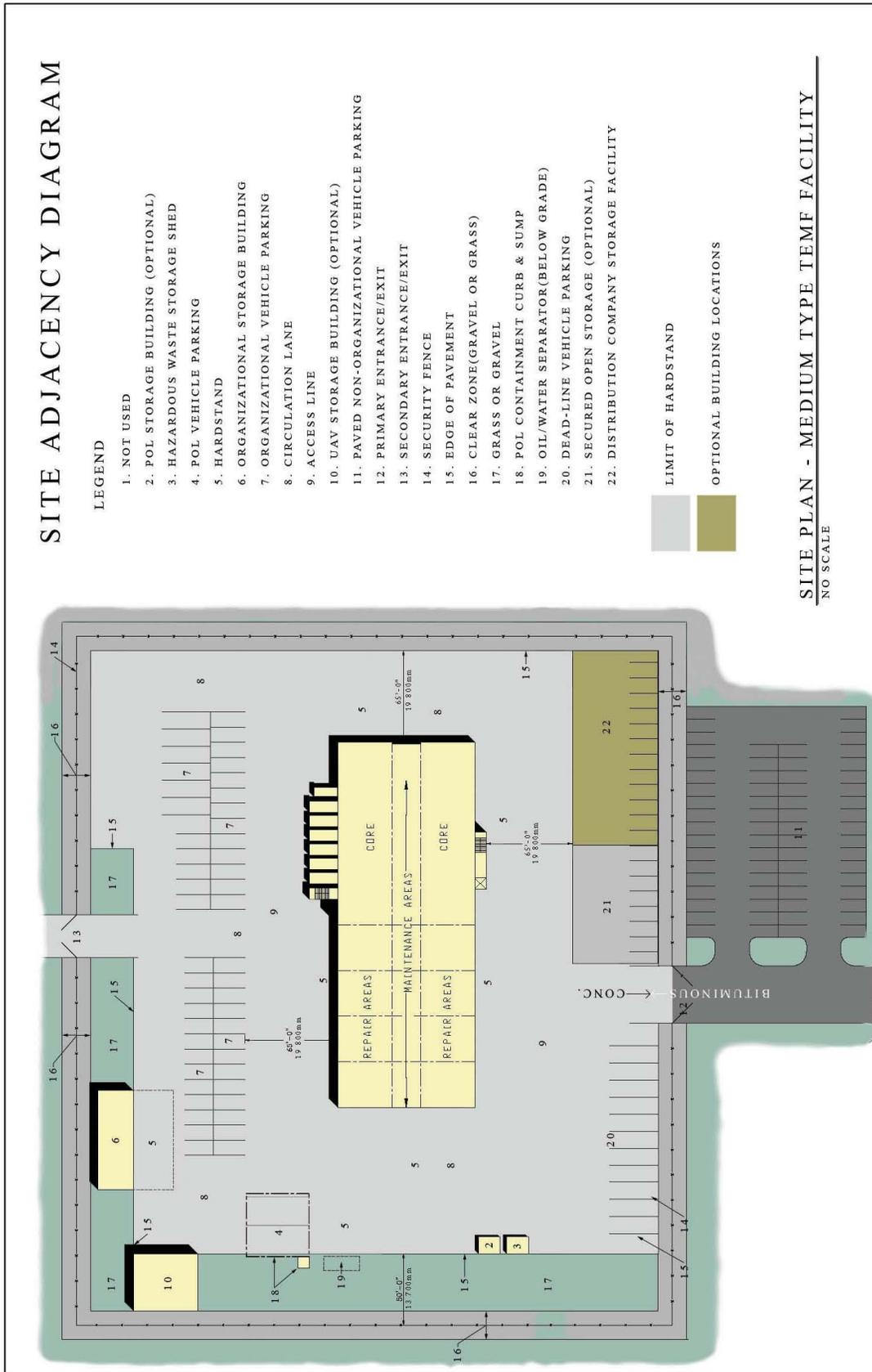
(h) Used Engine Coolant (antifreeze) Storage Tank(s). Provide one 500-gallon above-ground used engine coolant storage tank at the end of the Repair Areas. Tank shall be constructed of non-corrosive material. Provide secondary containment in compliance with applicable federal and state environmental regulations. Tank construction and location shall comply with IBC requirements. Recommended location is adjacent to the end repair areas. Used oil, waste fuel, and used engine coolant storage tanks should be co-located, if possible.

(i) Out of Spec Waste Fuel Tank(s). Provide one 500-gallon above-ground Out-of-Spec Waste Fuel Tank at the end of Repair Areas. Tank shall be constructed of non-corrosive material. Provide secondary containment in compliance with applicable federal and state environmental regulations. Tank construction and location shall comply with IBC requirements. Recommended location is adjacent to the end repair area. Used oil, waste fuel, and used engine coolant storage tanks should be co-located, if possible.

(4) Entrance Drives. Provide primary and secondary entrance drives to connect organizational vehicle hardstand to existing roads and/or tank trails.

(5) Privately Owned Vehicle (POV) Parking. Provide POV parking at the rate of 56% of the total assigned personnel.

3.1.4. Site Design The following drawing should be used to associate relative adjacencies for site structures.



(1) Hardstand. All hardstand areas shall be rigid concrete pavement. Pavement design for organizational vehicle areas shall be designed to support the vehicles assigned to this facility and the heaviest vehicle at the

installation. See appendix for Organizational Vehicle assigned to this facility. The parking layout and configuration shall be adjusted as necessary to for the site limits and space provided.

- (2) Antiterrorism and Force Protection. Each project should be evaluated for security requirements in accordance with UFC 4-010-01. Minimum requirement is a security fence at the site perimeter consisting of 7-foot high chain link fabric plus a single outrigger with 3-strand barbed wire, designed in accordance with STD 872-90-03, FE-6, Chain-Link Security Fence Details. A zone cleared of trees and shrubs, 20 feet wide inside the fence and 10 feet wide outside the fence is required. The clear zone shall be gravel underlain by a synthetic fabric. The clear zone shall be treated with herbicides to discourage vegetative growth. Manually operated vehicular gates, approximately 30 feet wide overall, shall be provided at each vehicle entrance/exit.
- (3) Storm Water Management. Site storm water management may require controls on the peak flow that can be discharged. Installations are required to have a storm water pollution prevention plan. Implement the applicable portions of this plan using best management practices. Segregate drainage from areas likely to be contaminated (e.g., fueling area). Provide treatment for contaminated water prior to its discharge. Maintenance should not be performed outside the primary facility.
- (4) Storm Drainage System. Construction and material specified for storm drainage installation shall be per the State's DOT requirements. All storm drainage lines constructed under organizational vehicle hardstand, entrance drives, and other surfaces subject to vehicular traffic shall be reinforced concrete pipe with watertight joints. See paragraph 6 for additional storm drainage system requirements.
- (5) Oil/Water Separator. One or more oil/water separators are required to remove, oil, lubricants, floatables, and grit from contaminated water sources (e.g., repair and maintenance areas, POL fluids distribution, etc.). Oil/water separators shall be designed in accordance with local codes and standard industry practice for the specific waste stream to be treated. Minimize maintenance requirements and locate oil/water separators to minimize pipe runs, provide vehicular access, and built out of circulation areas.
- (6) Used and Waste Oil, Antifreeze, Solvents, Cleaning Compounds, and Hazardous Materials Hazardous materials generated in the course of maintenance operations shall be classified in accordance with 40 CFR 261. Criteria for short term storage (less than 90 days) of hazardous materials is provided in 40 CFR 262. Long-term storage is not authorized for TEMF facilities. The installation Defense Resources Management Office has responsibility for long term storage. Long term storage of hazardous materials is governed by 40 CFR 264.
- (7) Primary and Secondary drives. Provide a primary and secondary entrance drive into the organizational vehicle hardstand area. The primary and secondary entrance drives shall be 30 feet wide.
- (8) Organizational Vehicle hardstand. Organizational vehicle pavement grades shall provide positive surface drainage with a 1 percent minimum slope in the direction of drainage. Maximum pavement slope shall be 2 percent.
- (9) Circulation Lane. Organizational vehicle parking circulation lanes shall be 20 feet wide when lanes are located adjacent to TEMF aprons. Parking stalls within the hardstand are to be placed back-to-back with circulation lane widths of 30 feet for vehicles less than or equal to 18 feet long and 45 feet for vehicles more than 18 feet long.
- (10) Tactical/Military Vehicle Parking. Tactical/Military Vehicle Parking spaces shall be spaced with side clearances of 3 feet and end clearances of 2 feet.
- (11) POL Vehicle Parking (if applicable). POL vehicle parking shall be physically separated from organizational hardstand. POL parking shall be spaced a minimum of 10 feet between vehicles. POL parking area circulation lanes shall be 50 feet wide. Drainage from the POL parking area shall be isolated and shall not be allowed to enter underground storm or sanitary sewer systems without being impounded first and manually released. POL drainage impoundment shall be located 100 feet from any structure.
- (12) Dead Line Vehicle Parking. Dead Line Vehicle Parking spaces shall be sized based on the largest vehicle for the assigned maintenance bay. Parking spaces shall be spaced with side clearances of 3 feet and end clearances of 2 feet.
- (13) TEMF Aprons. TEMF aprons shall measure 45 feet wide on all four sides of the facility. Circulation lanes are not part of the 45-foot wide apron.
- (14) Site Storage Building Aprons. Site storage building aprons shall measure 27 feet wide along the entire building length on the vehicular access side. Circulation lanes are not part of the 27-foot wide apron.
- (15) Bollards at TEMF repair bays. Provide 12-inch diameter steel bollards filled with concrete at all TEMF repair bay openings where frequent vehicle access/egress increases the risk of damage by vehicle impact. Bollard footings shall be designed to withstand organizational vehicular impact.

(16) Mechanical and Electrical Equipment Yard. Provide 12-inch diameter by 5-foot high, concrete-filled, schedule 80 galvanized steel pipe bollards, 5 feet O.C. spacing, 5 feet from edge of the mechanical and Electrical Equipment Yard, painted safety yellow, around the perimeter of the equipment yards. Provide vehicular access and locate out of circulation areas. Bollard footings shall be designed to withstand organizational vehicular impact.

(17) Bollards at Out of Spec Waste Fuel, Used Oil and Used Engine Coolant (antifreeze) Storage Tank(s). Provide 12-inch diameter by 5-foot high, concrete-filled, schedule 80 galvanized steel pipe bollards, 5 feet O.C. spacing, 5 feet from edge of containment wall, painted safety yellow, around the perimeter of above-ground tank areas. Bollard footings shall be designed to withstand organizational vehicular impact.

(18) Bollards at Site Storage Buildings. Provide 12-inch diameter by 5-foot high, concrete-filled, schedule 80 galvanized steel pipe bollards, 5 feet O.C. spacing, 5 feet from the edge of the building. Bollard spacing may be greater than 5' O.C. if portion of building being protected is not in a high volume traffic area. Bollard footings shall be designed to withstand organizational vehicular impact.

### 3.1.5. Architecture

(1) Exterior Materials. Select exterior materials to be attractive, economical, and durable and low maintenance. Masonry walls are recommended at the ground floor level.

(2) Floors. Provide concrete floors in maintenance and repair areas sloped in accordance with NFPA 30A and IBC/IPC. Provide a continuous trench drain located on the interior side of the overhead doors at repair areas and at centerline of central vehicle corridor, extending the length of maintenance areas.

(3) Natural Lighting. Repair and maintenance bays, storage and admin areas shall be illuminated using hybrid lighting systems which includes electric lighting with electronic daylight controls in combination with skylights with reflective tube that channels the light into the work area and a lens that diffuses the light, clerestory windows, and translucent wall panels above overhead doors. Open maintenance and storage sheds shall use hybrid lighting systems with a dome-shape skylights. Provide operable windows for natural lighting and ventilation in administration and shop control, training room, break/training/conference room, and consolidated bench repair shop. Preference will be given for designs providing vision panels in overhead doors.

(4) Partitions. Fixed walls are required to separate repair areas and maintenance areas from the core areas, along corridors, and surrounding fixed areas such as latrines, vaults, storage areas and shops. Shops and storage areas may be subdivided with metal mesh partitions. Admin., training and break room walls should be non-load bearing to the greatest extent possible (for example, gypsum board on steel studs) except around latrines.

(5) Sound Insulation. Provide sound insulation in all administration areas, training rooms, and bench repair areas to meet a minimum rating of STC 42 at walls and floor/ceiling assemblies, and a rating of STC 33 for doors. In addition to the sound insulation required, training areas shall meet a Noise Criteria (NC) 30 rating in accordance with ASHRAE Fundamentals Handbook.

(6) Repair Area Bay Doors. Provide overhead doors 24 feet wide by 14'-0" feet high in the exterior wall at each end of each structural bay. Provide doors of coiling, sectional, or telescoping design. Provide electrically operated doors with provision for manual chain operation. Provide manual 10-foot by 10-foot overhead doors for Consolidated Bench Repair Shop.

(a) Locking. Provide overhead doors that are operable from the interior only. Provide doors with a positive locking mechanism that will allow the door to remain open at engine exhaust position approximately 1 foot above the floor. Coordinate door locking requirements with the using service.

(b) Serviceability. Repair and maintenance bay doors shall be designed to meet heavy duty loads and high frequency of operation. Provide testing of deflection and operation of the doors prior to acceptance during construction. Doors shall be provided and installed by a commercial door company having not less than 5 years of experience in manufacturing, installing, and servicing the size and type of doors provided.

(c) Insulated Doors. Preference will be given to proposals that include insulated doors for thermal resistance and noise control.

(7) Personnel Doors. Provide exterior personnel doors in the ends of central vehicle corridor portion of maintenance areas and in the circulation bays as shown on the drawings. Provide steel doors with vision panels, except at storage, janitorial, and latrine areas. Minimum size for personnel doors is 3 feet wide by 7 feet high.

(8) Overhead Cranes. Crane shall be designed and constructed to CMAA 70 (Class C) or CMAA 74 (moderate requirements) for operation with hoist in accordance with ASME HST-1 or HST-4.

(a) The 10-ton crane shall have the following rated load speeds (plus or minus 15 percent):

1. Hoist - 20 fpm
2. Trolley - 65 fpm
3. Bridge - 125 fpm

(b) The 35-ton crane shall have the following rated load speeds (plus or minus 15 percent):

1. Hoist - 10 fpm
2. Trolley - 60 fpm
3. Bridge - 85 fpm

(c) Hoist motor control system shall provide one speed in each direction.

(d) Bridge and trolley main control systems shall provide one speed in each direction.

(e) Provide runway stops at limits of crane bridge travel.

### 3.1.6. Fire Protection

#### 3.1.6.1. Standards and Codes

All fire protection and life safety features shall be in accordance with UFC 3-600-01 and the criteria referenced therein. Tactical Equipment Maintenance Facilities shall be classified as mission essential and shall be provided with complete sprinkler protection.

#### 3.1.6.2. Fire Protection and Life Safety Analysis

A fire protection and life safety design analysis shall be provided for all buildings in the project. The analysis shall be submitted with the interim design submittal. The analysis shall include classification of occupancy (both per the IBC and NFPA 101); type of construction; height and area limitations (include calculations for allowable area increases); life safety provisions (exit travel distances, common path distances, dead end distances, exit unit width required and provided); building separation or exposure protection; specific compliance with NFPA codes and the IBC; requirements for fire-rated walls, doors, fire dampers, etc.; analysis of automatic suppression systems and protected areas; water supplies; smoke control systems; fire alarm system, including connection to the base-wide system; fire detection system; standpipe systems; fire extinguishers; interior finish ratings; and other pertinent fire protection data. The submittal shall include a life safety floor plan for all buildings in the project showing occupant loading, occupancy classifications and construction type, egress travel distances, exit capacities, areas with sprinkler protection, fire extinguisher locations, ratings of fire-resistive assemblies, and other data necessary to exhibit compliance with life safety code requirements.

#### 3.1.6.3. Sprinkler System

Provide complete sprinkler protection for Vehicle Maintenance, UAV Maintenance and Storage Buildings, Organizational Storage Buildings, and Distribution Company Storage Buildings. Wet pipe sprinkler systems shall be provided in areas that are heated and dry pipe sprinkler systems shall be provided in areas subject to freezing. All floors and all areas of the facilities shall be protected. The sprinkler system design shall be in accordance with UFC 3-600-01 and NFPA 13. The sprinkler hazard classifications shall be in accordance with UFC 3-600-01, NFPA 13, and other applicable criteria. Design densities, design areas and exterior hose streams shall be in accordance with UFC 3-600-01. The sprinkler systems shall be designed and all piping sized with computer generated hydraulic calculations. The exterior hose stream demand shall be included in the hydraulic calculations. A complete sprinkler system design, including sprinklers, branch lines, floor mains and risers, shall be shown on the drawings. The sprinkler system plans shall include node and pipe identification used in the hydraulic calculations. All sprinkler system drains, including main drains, test drains, and auxiliary drains, shall be routed to a 2' x 2' splash block at exterior grade.

#### 3.1.6.4. Sprinkler Service Main and Riser

The sprinkler service main shall be a dedicated line from the distribution main. Sprinkler service and domestic service shall not be combined. The sprinkler service main shall be provided with an exterior post indicator valve with tamper switch reporting to the fire alarm control panel (FACP). The ground floor entry penetration shall be

sleeved per NFPA 13 requirements for seismic protection. The sprinkler entry riser shall include a double check backflow preventer, a fire department connection, and a wall hydrant for testing of backflow preventer. The sprinkler system shall include an indicating control valve for each sprinkler system riser, a flow switch reporting to the FACP, and an exterior alarm bell. All control valves shall be OS&Y gate type and shall be provided with tamper switches connected to the FACP. Facilities with multiple floors shall be provided with floor control valves for each floor. The floor control valve assembly shall be in accordance with UFC 3-600-01, Figure 4-1.

#### 3.1.6.5. Exterior Hose Stream

Exterior hose stream demand shall be in accordance with UFC 3-600-01. This shall be 250 gpm for light hazard and 500 gpm for ordinary hazard. Exterior hose stream demand shall be included in the sprinkler system hydraulic calculations.

#### 3.1.6.6. Backflow Preventer

A double check backflow preventer shall be provided on the fire water main serving each building. This shall be located within the building. An exterior wall hydrant with dual hose connections with OS&Y valve shall be provided to allow testing of backflow preventer at design flow as required by NFPA 13.

#### 3.1.6.7. Fire Department Connection

A fire department connection shall be provided for each building with sprinkler protection. These shall be located to be directly accessible to the fire department.

#### 3.1.6.8. 3.1.6.4 Elevators

The fire protection features of elevators, hoist ways, machine rooms and lobbies shall be in accordance with UFC 3-600-01, ASME A17.1, NFPA 13 and NFPA 72.

#### 3.1.6.9. System Components and Hardware

Materials for the sprinkler system, fire pump system, and hose standpipe system shall be in accordance with NFPA 13 and NFPA 20.

#### 3.1.6.10. Protection of Piping Against Earthquake Damage

Sprinkler and fire pump piping systems shall be protected against damage from earthquakes. Seismic protection shall include flexible and rigid couplings, sway bracing, seismic separation assemblies where piping crosses building seismic separation joints, and other features as required by NFPA 13 for protection of piping against damage from earthquakes.

#### 3.1.6.11. Fire Water Supply

Fire flow test data is provided in Appendix D.

#### 3.1.6.12. Fire Pump

Refer to paragraph 3.1.9, Electrical and Communication Systems, for requirements.

#### 3.1.6.13. Fire Detection and Alarm

A fire alarm and detection system shall be provided for this facility. It shall comply with the requirements of UFC 3-600-01 and NFPA 72. The system shall be addressable and fully compatible with and integrated with the local base wide central monitoring system.

#### 3.1.6.14. Building Construction

Construction shall comply with requirements of UFC 3-600-01, the International Building Code and NFPA 101.

### 3.1.6.15. Fire Extinguishers Cabinets and Brackets

Fire Extinguisher cabinets and brackets shall be provided when fire extinguishers are required by UFC 3-600-01 and NFPA 101. Placement of cabinets and brackets shall be in accordance with NFPA 10. Semi-recessed cabinets shall be provided in finished areas and brackets shall be provided in non-finished areas (such as utility rooms, storage rooms, shops, and vehicle bays). Fire extinguishers shall not be provided in this contract.

### 3.1.6.16. Interior Wall and Ceiling Finishes

Interior wall and ceiling finishes and movable partitions shall conform to the requirements of UFC 3-600-01 and NFPA 101.

### 3.1.7. Heating, Ventilation, and Air Conditioning (HVAC) Systems

(1) Ventilation System. Ventilation Supply system for the repair and maintenance bays and the vehicle corridor shall be designed to provide 100% of outdoor air with no recirculation and sized for minimum of 1.5 cfm per square foot per ASHRAE 62.1. The ventilation air shall be tempered to 55 degrees (F). CO and NOx sensors shall be provided throughout the repair bays and vehicle corridor. If the sensors register concentrations above acceptable levels they shall initiate an alarm both locally and at the Building Automation System. The general system's fan shall be equipped with a VFD to adjust the exhaust airflow rate based on the operation of the vehicle exhaust systems. The repair and maintenance areas and vehicle corridor shall be maintained at negative pressure with respect to the air conditioned core area. UAV Maintenance and Storage Building shall be designed to provide 100% of outdoor air with no recirculation and sized for minimum of 1.5 cfm per square foot per ASHRAE 62.1. For the Organizational Storage, Distribution Company Storage, POL Building, mechanical and electrical rooms, the ventilation rate shall be such that the space is maintained at a maximum of 10 degrees (F) above ambient conditions. Air supplied into the air conditioned core area shall be cascaded into adjacent areas for pressurization and to prevent polluted air from entering this area.

(2) System Selection.

(a) Repair and maintenance bays, the vehicle corridor, the UAV Maintenance and Storage Building and Distribution Company Storage Building are to be heated to 55 degrees F. Other site storage buildings (see paragraph 3.2.f) are to be heated to 40 degrees F for freeze protection.

(b) Occupied spaces within the core shall be heated and cooled in accordance with Paragraph 5 of Section 01 11 00. Consider all viable alternative systems meeting the functional requirements of each of the areas of the facility. For the core spaces, consider packaged equipment, split systems or systems utilizing chilled/heating water from either a central plant or decentralized sources.

(c) Return air plenum systems are not allowed for Tactical Equipment Maintenance Facilities.

(d) Consider use of evaporative air pre-cooling in hot climates.

(e) Telecommunications Rooms and SIPRNet rooms will each be served by an independent and dedicated air-handling system. Air handling unit system(s) shall not be floor-space mounted within the actual space served. Rooms shall be maintained at 72 degrees F and 50 percent relative humidity year-round. Assume 616 Watts per hour for the equipment heat dissipation. Bollard spacing may be greater than 5' O.C. if portion of building being protected is not in a high volume traffic area. Contractor shall verify this load during the design stage.

(3) Building Exhaust Systems. Provide general exhaust in repair and maintenance areas and exhaust systems at maintenance area pit, welding area and weapons vault. Welding function is portable but welding exhaust shall be a part of the building construction. Exhaust fan shall be non-sparking. Maintenance area pit exhaust system will be ducted exhaust system with explosion proof fans. Welding exhaust shall be manually engaged during the welding activity. All other exhaust systems will operate continuously while the building is occupied. Exhaust duct openings shall be located so that they effectively remove vapor accumulations at floor level from all parts of the floor area. Exhaust systems shall be in accordance with NFPA 30 and 30A. Energy recovery from exhaust air shall be used in climate zones 3 through 8.

(4) Vehicle Exhaust Evacuation Systems. Vehicle exhaust evacuation system for wheeled and tracked vehicles shall be provided at each repair area and along the vehicle corridor allowing for capturing exhaust fumes from stationary vehicles and vehicles moving in and out of the building and along the vehicle corridor. Consider viable alternative systems meeting the functional requirements of each of the areas of the facility. Size and locate the exhaust lines as required to service vehicles and equipment within the repair areas. Lines shall not interfere with maintenance operations or obstruct equipment such as the traveling bridge crane. 50% duty cycle of the total

available capacity of vehicle exhaust can be considered unless specified otherwise by the using service. The using service is responsible for providing the transition connectors (if required, depending on the type of exhaust system provided) between the vehicle exhaust and the vehicle exhaust system installed in the building. All system components must be compatible with the vehicle exhaust temperatures. Unless otherwise indicated by the user, design exhaust outlets for 1400 cfm and 700 degrees F. Exhaust evacuation systems in repair bays intended for repair of tracked vehicles shall be designed to withstand at least 1250 degrees F and shall have two exhaust outlets evacuating 1400 cfm each which can be connected to tracked vehicle's exhaust grills. Ventilation in the maintenance and repair bays shall be as a minimum per ASHRAE 62.1. Additional makeup air may be needed compensate for the exhaust requirements.

(5) HVAC Controls. HVAC Controls shall be in accordance with paragraph 5.8.3. See Appendix for HVAC Controls for typical control system points schedules. These schedules identify as a minimum points to be monitored and controlled by the building automation system (BAS). See paragraph 6 for any additional installation specific points. Points schedule drawings convey a great deal of information critical to design, installation, and subsequent performance of the control system. It includes hardware input/output information, device ranges and settings, ANSI 709.1 communications protocol data, and information about data that is to be used at the operator workstation by Monitoring and Control software. These schedules are available as an excel spread sheet and as AutoCAD drawings on Engineering Knowledge Online (EKO) website <https://eko.usace.army.mil/fa/bas/>. Point schedule of system types not addressed in the appendix shall be developed by the Contractor, and shall be sufficiently detailed to a level consistent to a similar listed system in the appendix. It is recommended that all of the guidance and instruction documents be reviewed prior to using any of the info, as the documents provide necessary and critical information to the use of website drawings and other information.

### 3.1.8. Plumbing

(1) Trench Drains. Design trench drain for easy cleaning. Provide basket strainers to facilitate trash removal where trench drains discharge to piping systems. Convey waste to exterior oil/water separator prior to discharge to the sanitary sewer system. When a dedicated, partitioned welding area is provided, provide a solid cover to the trench drain where it runs through the welding area.

(2) Emergency Showers and Eye Washes. See Section 3.1.1 (3) (b) for eye wash, hand held drench hose and emergency shower requirements within the repair and maintenance areas and core area.

(3) Compressed Air. Provide the compressed air outlets with quick disconnect couplings in all repair and maintenance areas, along the vehicle corridor, at two places in the pit, and in the Consolidated Bench Repair area. Provide one compressed air outlet per bench in Consolidated Bench Repair area. Each drop shall include an isolation valve, filter and pressure regulator, condensate trap with drain cock. Provide air compressor with receiver, refrigerated air dryer, filtration and pressure regulation. The air compressor shall be installed building equipment. Size air compressor for 10 CFM per outlet in repair and maintenance areas and 5 cfm per outlet in the Consolidated Bench Repair area, with a 60 percent diversity (assume 60% of all drops in the facility will be in use at the same time), plus any additional compressed-air equipment in the facility. Unless otherwise indicated by the user requirements in paragraph 6, provide compressed air at 120 psi.

(4) Sump Pump. Provide sump pump in maintenance pit and elevator pit. Determine if maintenance pit sump pump shall be explosion proof type and provide explosion type, if required. Sump pump shall be submersible type and shall be capable of handling small amounts of oil and anti-freeze. Maintenance pit and elevator pit sumps shall discharge to an oil water separator.

### 3.1.9. Electrical and Telecommunications Systems

See Paragraph 6 for work to be performed by others (work indicated in paragraph 3 shall be a part of this contract unless otherwise indicated in paragraph 6), clarifications and additional requirements for the electric and telecommunications systems.

(1) Exterior Electrical Distribution System

(a) Parking Pad and Power Connections. Provide power connections to hardstand for existing equipment as required in Features Matrix.

(2) Exterior Lighting

(a) Exterior Lighting General. Exterior lighting systems inside the TEMF security fence shall be provided for sidewalks, roadways, service yards, facility aprons, open storage areas and parking areas. Exterior lighting shall consist of high intensity discharge (HID) light fixtures, mounted on poles located within the AT/FP fence line clear

zone and elsewhere as required to attain illumination levels and uniformity. Poles located within the service yards, facility aprons and hardstand parking areas shall be located and protected to minimize damage from vehicles. Building-mounted light fixtures may be used around the building perimeter to supplement pole mounted light fixtures. Building mounted light fixtures used solely for building perimeter and doorway lighting may be fluorescent. Illumination levels shall be 5 foot-candles for areas adjacent to the primary facility and no less than 0.5 foot-candles for parking areas. Exterior lighting shall be controlled by a photosensor or astronomical time clock that is capable of automatically turning off the exterior lighting when sufficient daylight is available or the lighting is not required.

(b) Perimeter Security Lighting. Protective lighting systems shall be provided in response to project specific requirements to deter trespassers and make them visible to guards. Levels of exterior lighting for protected areas shall conform to the requirements in the IESNA Lighting Handbook. Lighting circuits shall be controlled by a photosensor with manual override.

(3) Exterior Communication Services

(a) Parking Pad and Data Connections. None required

(4) Interior Electrical and Telecommunications

(a) Electrical

i. Power Service. In the electrical equipment room provide a space for 3-phase, 200 ampere breaker with additional 3-phase, 200 ampere power capacity for this breaker in the main switch board. Installation shall conform to NFPA 70, National Electrical Code.

ii. Nonlinear Loads. The effect of nonlinear loads such as computers and other electronic devices shall be considered and accommodated as necessary. These loads generate harmonics, which can overload conventionally sized conductors or equipment and thereby cause safety hazards and premature failures. Circuits serving such devices shall be equipped with a separate neutral conductor not shared with other circuits. Panelboards and any dry type transformers shall be rated accordingly.

iii. Lightning Protection System and Transient Voltage Surge Protection. Design shall be in accordance with NFPA 780 and other referenced criteria. Provide transient voltage surge protection. All tactical equipment maintenance facilities are classified as mission essential and continuity of facility services is required for lightning protection risk assessments.

(b) Receptacles. Power receptacles shall be provided per NFPA 70 and in conjunction with the proposed equipment and furniture layouts. Provide power connectivity to each workstation. Provide a duplex receptacle adjacent to each duplex voice/data and CATV outlet.

(c) Special Power Requirements. Electrical power outlets for special power shall be coordinated with workbench locations in shops and provided in the maintenance areas. Both low voltage and high frequency power may be required in some areas. See the TEMF Features Matrix. Coordinate with the User for the electrical characteristics of the equipment to be provided by the Government.

(d) Hazardous Locations. Hazardous locations shall be clearly defined on the drawings by the designer based on the intended use of the facility and applicable criteria. Receptacles, devices, equipment and wiring in hazardous locations shall be designed (UL listed for the application) and installed in accordance with the NFPA codes. When hazardous locations are determined to be up to 18 inches above the finished floor, receptacles and devices and conduit routing to them shall be installed above the hazardous area, where possible.

(e) Lighting. Lighting and lighting controls shall comply with the recommendations of the Illumination Engineering Society of North America (IESNA) and the requirements of ASHRAE 90.1.

i. Office, Training Room and Conference Room Lighting. Interior ambient illumination shall provide a generally glare free, high quality lighting environment conforming to IESNA RP-1-04. Training rooms and conference rooms shall have a dimmable circuit providing general lighting without glare on audio-video displays. Dimming ballasts shall be capable of dimming to 5 percent.

ii. Repair and Maintenance Areas. Illumination of the repair maintenance areas shall consist of T5, T5HO or T8 fluorescent light fixtures. The fixture layout shall be coordinated with the traveling bridge crane requirements.

iii. Maintenance Pit Lighting. Illumination in maintenance pits shall consist of T5, T5HO or T8 fluorescent linear light fixtures mounted in the pit area for general illumination. Task illumination shall be provided by no fewer than four pit-mounted incandescent, compact fluorescent or metal halide adjustable, swing-arm task lights. In lieu of swing-arm task lights, no fewer than two receptacles with cord and plug incandescent, compact fluorescent or

metal halide portable safety lights may be provided. Each cord shall be of adequate length to service no less than 60 percent of the pit area. All equipment shall be suitable for the hazardous classification of the pit.

iv. Illumination Levels. Maintained Illumination levels shall be in accordance with the Table 4 below. Maintained illumination levels in areas not included in Table 4 shall comply with the recommendations of the IESNA Lighting Handbook. Illumination levels in maintenance pits shall be calculated based on no contribution from the overhead ambient light fixtures.

TABLE 4 ILLUMINATION LEVELS	
FUNCTIONAL AREA	FOOT CANDLES
Administration and Shop Control	50
Warehouse, Storage, and Miscellaneous Rooms	20
Latrines, Showers, and Lockers	20
Break, Training, and Conference	30
Repair and Maintenance Areas	50
Weapons Storage and COMSEC Vaults	50
Maintenance Pit	15
Repair Shops (General Item, Compact Item, Special Environment, Battery, etc.)	50
Electrical/Mechanical Rooms	30

(f) Telecommunications System including Telecommunications and SIPRNET Minimum Room Sizes - Telecommunication Pathways, Outlets and Cabling. Telecommunications cabling shall be Category 6 for all voice and data connections unless length of run warrants need for multimode fiber optic cable. Provide number and type of connectors as defined by the User. Telecommunications outlets and conduits shall be provided in core areas and supply administration areas with a minimum of one outlet in each work area. Each Training Room shall have a voice outlet. Each Training Room shall have a data connection for each seat and for an instructor. Each repair area workstation shall have access to a data connection. In administration and shop control areas provide a voice and data outlet for every workstation. A data outlet shall be provided at each copier location. Provide a single jack outlet for wall mounted GFGI phones in mechanical, electrical, vaults, telecommunications room and corridors. For controlled access facilities, provide outlets for wall mounted GFGI phones at primary entrance. Additional outlet locations may be provided based on coordination with the facility User and where required for HVAC equipment or other equipment. Provide outlets per I3A technical criteria and Table 5 below. Provide Telecommunications and SIPRNET rooms minimum sizes as indicated in Table 5A below.

TABLE 5 OUTLET DENSITIES	
FUNCTIONAL AREA	AREA PER OUTLET (SF)
Administration and Shop Control	80
Latrines, Showers, and Lockers	0
Break, Training, and Conference	80

Repair and Maintenance Areas	500
Weapons Storage and COMSEC Vaults	80
Repair Shops ( Consolidated bench repair, Battery, etc)	80

TEMF	Telecommunications Room		SIPRNET Room		
	Floor	Width Feet (min)	Square Feet (min)	Width Feet (min)	Length Feet (min)
1st Small		8	150	6	6
1st Medium		8	150	6	6
2nd Medium		8	110	None	None
1st Large		8	150	6	6
2nd Large		8	110	None	None
1st EXLarge		8	150	6	6
2nd EXLarge		8	150	None	None

General Notes:  
 1. Width is a minimum inside edge of wall to inside edge of wall dimension inside the room. Length shall be greater than or equal to width.  
 2. The Telecomm room shall not be less than the minimum width and square feet indicated above and the SIPRNET rooms shall not be less than the minimum width not be less than the minimum width and length indicated above.  
 Telecommunications and SIPRNET rooms shall be rectangular in shape.

(g) Cable Television (CATV). A minimum of two CATV outlets shall be provided in the Break, Training, and Conference Room and Admin and Shop Control Room. The cable television system shall consist of cabling, pathways and outlets. All building CATV systems shall conform to applicable criteria to include I3A Technical Criteria and the UFC 3-580-01 Telecommunications Building Cabling Systems Planning Design.

(h) Audio/Visual Systems

i. Audio/Visual Systems. Provisions (consisting of a power receptacle and conduit for signal wiring) for a GFGI projector shall be provided in each Training Room.

ii. Paging Systems. A paging system shall be provided for the repair areas and maintenance areas with the microphone located in the administration and shop control area. The system shall be zoned for multiple bay operation and shall have input from the telephone system.

(i) Security Infrastructure. The security infrastructure shall be installed to support GFGI equipment including cameras, door alarms, and motion sensors.

i. Intrusion Detection and Security Systems. Provision for user provided ICIDS intrusion detection and security systems are required for secure and restricted areas including the arms vault, COMSEC vault and SIPRNet room. Provisions shall include dedicated power circuits, telecommunications connections, and raceways and signal wiring for user installed devices. System requirements shall be coordinated with the Installation Security Office.

ii. Access Control System. The access control system shall consist of proximity sensors throughout the facility with varying levels of security. System requirements shall be coordinated with the Installation Security Office.

(j) Mass Notification System (MNS). A mass notification system shall be provided as required by UFC 4-010-01.

(k) Grounding. Each maintenance building shall have a ground grid around the building perimeter for grounding incoming service, building steel, lightning protection, telephone service, piping, and internal grounding requirements. Ground busbar shall be provided on walls of each repair area. A grounding point shall be provided in each repair area and each maintenance area. Each repair area and maintenance area is 16' x 32' in size. Grounding points shall be provided in vehicle and equipment parking areas on 40-foot centers (maximum) and

coordinated parking layout. It will be acceptable to provide a minimum of one grounding point for every eight vehicles parked in a double row, and one grounding point for every four vehicles parked in a single row configuration. Equipment parking grounding shall be in accordance with the recommendations of MIL-HNBK-419A, which is referenced in I3A. This includes, but is not limited to, the earth electrode subsystem should exhibit a resistance to earth of 10 ohms or less and multiple ground rods should be interconnected using 1/0 AWG bare copper cable. Install an interior #2 AWG bare tinned copper ground loop around the perimeter of the Fluid Distribution Room for dissipation of potential static charge. Bond ground loop to building structure and grounding riser. Provide thirty (30) #6 AWG bare copper pigtails complete with alligator clips on both ends for grounding of metallic barrels/dispensing equipment. Length of pigtails should be based on potential layout of equipment/drums and the location of ground ring. Additional grounding may be provided based on project requirements. Systems shall conform to NFPA 70 National Electrical Code, NFPA 780 Standard for the Installation of Lightning Protection Systems, local codes and the Technical Criteria for Installation Information Infrastructure Architecture (I3A).

(l) SIPRNET. The SIPRNET room shall be designed and constructed in accordance with the "Building SIPRNET Communication Room – New Construction Guidance", paragraph of the Technical Guide for Integration of SIPRNET (Secret Internet Protocol Router Network). The SIPRNET room design and construction shall be coordinated with local DOIM and Physical Security Office. SIPRNET conduit and cable to SIPRNET Drops and the SIPRNET Drops will be provided in the future and is not to be provided as part of this scope of work. Connection to the main telecommunications room from the SIPRNET room shall be via a 2-inch trade size steel conduit. Provide six strands of single mode fiber optic cable from Telecommunications Room to the SIPRNET Room. Provide a communications signal ground bus bar connected to the main communications room signal bus bar via a properly sized ground wire (see MIL-HDBK-419-A, which is referenced in the Technical Guide for the Integration of SIPRNET). Provide one dedicated standard 20-amp duplex receptacle for future SIPRNET rack in addition to convenience receptacles in the SIPRNET room.

(m) Hydraulic Lift. In each pair of repair areas, provide electric power for User provided (GFGI) portable hydraulic lift. Coordinate electrical requirements with the User.

(n) Fire Detection and Alarm

i. A fire alarm and detection system shall be provided for this facility. It shall comply with the requirements of UFC 3-600-01 and NFPA 72. The system shall be addressable and fully compatible with and integrated with the local installation wide central monitoring system. Coordinate fire alarm system requirements with the Fire Department's Representative during design.

ii. All initiating devices shall be connected, Class A, Style 6, to signal line circuits (SLC). All alarm appliances shall be connected to notification appliance circuits (NAC), Class A. A looped conduit system shall be provided so that if the conduit and all conductors within are severed at any point, all NAC and SLC shall remain functional.

iii. Breakglass manual fire alarm stations shall not be used.

iv. Over-voltage and surge protection shall be provided at the input power of all panels.

### 3.1.10. COMPLIANCE WITH THE ENERGY POLICY ACT OF 2005 (EPACT 2005)

(1) EPACT 2005 REQUIREMENT. The building, including the building envelope, HVAC, ventilation and exhaust systems, service water heating, power, and lighting systems shall be designed to achieve an energy consumption that is at least 30% below the consumption of a baseline building meeting the minimum requirements of ANSI/ASHRAE/IESNA Standard 90.1-2004 (see paragraph 5.9 Energy Conservation)

(2) TARGET ENERGY CONSUMPTION BUDGET. The target energy consumption budget (excluding plug loads) for this facility located in DOE Climate Zone 4C is 45 kBtu per ft<sup>2</sup> per year or less. The use of the Prescriptive Technology Solution Set, shown below, will result in an annual energy consumption less than or equal to the target energy budget figure.

(3) EPACT Methodology. See below for two paths (Prescriptive and Compliance) for demonstrating compliance with EPACT.

(a) Prescriptive path (use of technology solution set). The technology solution set shown in the table below, in combination with mandatory requirements for all TEMF stated in paragraph 3.1, including daylighting, demand controlled ventilation systems and robust vehicle exhaust evacuation systems, achieves the above energy performance and life cycle cost effectiveness requirements for a TEMF facility in the indicated DOE climatic zone. The use of the prescriptive technology solution set is optional. The contractor may elect to develop his own unique solution as described under the Compliance Path.

**Climate Zone 4C, Prescriptive Technology Solution Table**

Item	Component	Baseline <sup>1</sup>	Improvement
<b>Roof</b>	Insulation above deck	R-15 ci	
	Metal building roof		R-13 + R-19
	Surface reflectance	0.3	0.65
<b>Walls</b>	Steel-framed	R-13	
	Metal building		R-13
<b>Slabs</b>	Unheated	NR <sup>2</sup>	NR
	Heated	R-7.5 for 24 in	R-10
<b>Doors</b>	Swinging	U-0.70	U-0.70
	Non-Swinging	U-1.45	U-0.25
<b>Infiltration</b>		0.5 ACH	0.5 ACH
<b>Vertical Glazing</b>	Window to Wall Ratio (WWR)	< 10%	< 10%
	Thermal transmittance	U-0.57	U-0.42
	Solar heat gain coefficient (SHGC)	0.39	0.46
	South Overhangs	None	NR
<b>Skylights</b>	Percent roof area	None	2%
	Thermal transmittance		U-0.69
	SHGC		0.34
<b>Interior Lighting</b>	Lighting Power Density	See Note 3	See Note 3
	Ballast		Electronic ballast
	Daylighting controls <sup>4</sup>	none	Yes
	Automatic Lighting Shutoff	Scheduled shutoff for all spaces	Occupancy sensors for all unoccupied spaces and where feasible for all occupied spaces
<b>HVAC</b>	Make up Air Unit Fans	See Fan Efficiency Table	See Fan Efficiency Table
	Air Conditioner	PSZ-AC 12.0 SEER	PSZ-AC 14.0 SEER
	Gas Coil	80% E <sub>t</sub>	90% E <sub>t</sub>
	Hydronic radiant floor heat	None	Ground floor
	ERV	None	Yes
<b>Economizer</b>		NR	NR
<b>Ventilation</b>	Outdoor Air Damper	Motorized control	Motorized control
	Demand Control	NR	Yes
	Transpired Solar Coll.	None	Yes
	Transpired Solar Coll.	None	Yes
<b>Ducts</b>	Sealing		Seal class B
	Location		Interior only
	Insulation level <sup>5</sup>		R-6
<b>Service Water Heating</b>	Gas storage	80% E <sub>t</sub>	90% E <sub>t</sub>

1. Baseline requirements are from ANSI/ASHRAE/IESNA Standard 90.1-2004.

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

3. Lighting power densities in accordance with the following table:

Zone	Baseline	Recommendation
Repair Bay	1.7 W/ft <sup>2</sup> (18.3 W/m <sup>2</sup> )	1.3 W/ft <sup>2</sup> (14.0 W/m <sup>2</sup> )

Zone	Baseline	Recommendation
Vehicle Corridor	0.7 W/ft <sup>2</sup> (7.5 W/m <sup>2</sup> )	0.7 W/ft <sup>2</sup> (7.5 W/m <sup>2</sup> )
Showers	0.6 W/ft <sup>2</sup> (6.5 W/m <sup>2</sup> )	0.6 W/ft <sup>2</sup> (6.5 W/m <sup>2</sup> )
Storage 1	0.9 W/ft <sup>2</sup> (9.7 W/m <sup>2</sup> )	0.9 W/ft <sup>2</sup> (9.7 W/m <sup>2</sup> )
Consolidated Bench	1.9 W/ft <sup>2</sup> (20.5 W/m <sup>2</sup> )	1.3 W/ft <sup>2</sup> (14.0 W/m <sup>2</sup> )
Storage 2	0.9 W/ft <sup>2</sup> (9.7 W/m <sup>2</sup> )	0.9 W/ft <sup>2</sup> (9.7 W/m <sup>2</sup> )
Office	1.0 W/ft <sup>2</sup> (10.8 W/m <sup>2</sup> )	0.9 W/ft <sup>2</sup> (9.7 W/m <sup>2</sup> )

4. Daylighting should be included in the repair bays, vehicle corridor, and office.
5. The duct and pipe insulation values are from the ASHRAE Advanced Energy Design Guide for Small Offices.

### Fan Efficiencies

System	Baseline Efficiency		Improved Efficiency	
	Fan Motor	Total Fan	Fan Motor	Total Fan
Repair Bay	0.80	0.27	0.90	0.45
Vehicle Corridor	0.80	0.19	0.90	0.45
Showers	0.80	0.20	0.85	0.34
Storage 1	0.80	0.20	0.85	0.34
Consolidated Bench	0.80	0.19	0.90	0.45
Storage 2	0.80	0.20	0.85	0.34
Office	0.80	0.20	0.85	0.34
Fan Coil Units	0.80	0.30	0.85	0.34

(b) Compliance path (unique design solution). When the "Compliance Path" is selected, the facility design shall include a uniquely developed technology solution set which can be shown by the design analysis (using facility energy simulation software) not to exceed the target energy consumption budget stated in Paragraph 3.1.10 (2) above and meet all the criteria in the DOE interim final rule: "Energy Conservation Standards for New Federal Commercial and Multi-Family High-Rise Residential Buildings and New Federal Low-Rise Residential Buildings"

(4) Schedules. If a unique technology solution set method of compliance is chosen then the following load schedules must be used in all facility energy simulations for purposes of showing compliance with Paragraph 3.1.10 (3) b. The plug loads in the following schedules shall be included in the energy simulation program but shall be manually subtracted from the calculations to compare the calculated budget to the target energy consumption budget in paragraph 3.1.10 (2). Additionally, for simulation of a baseline building model, the "baseline values" for each component shown in the "Prescriptive Technology Solution Table" shall be used.

Hr	Occupancy			Lighting			Plug Loads			Service Hot Water		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
1	0	0	0	0.04	0.04	0.04	0.2	0.2	0.2	0.03	0.03	0.03
2	0	0	0	0.04	0.04	0.04	0.2	0.2	0.2	0.03	0.03	0.03

Hr	Occupancy			Lighting			Plug Loads			Service Hot Water		
3	0	0	0	0.04	0.04	0.04	0.2	0.2	0.2	0.03	0.03	0.03
4	0	0	0	0.04	0.04	0.04	0.2	0.2	0.2	0.03	0.03	0.03
5	0	0	0	0.04	0.04	0.04	0.2	0.2	0.2	0.03	0.03	0.03
6	0	0	0	0.04	0.04	0.04	0.2	0.2	0.2	0.03	0.03	0.03
7	0	0	0	0.04	0.04	0.04	0.2	0.2	0.2	0.03	0.03	0.03
8	0.15	0	0	0.4	0.04	0.04	0.5	0.2	0.2	0.1	0.03	0.03
9	0.7	0	0	0.9	0.04	0.04	0.8	0.2	0.2	0.7	0.03	0.03
10	0.9	0	0	0.9	0.04	0.04	0.9	0.2	0.2	0.7	0.03	0.03
11	0.9	0	0	0.9	0.04	0.04	0.9	0.2	0.2	0.7	0.03	0.03
12	0.9	0	0	0.9	0.04	0.04	0.9	0.2	0.2	0.7	0.03	0.03
13	0.5	0	0	0.8	0.04	0.04	0.8	0.2	0.2	0.7	0.03	0.03
14	0.85	0	0	0.9	0.04	0.04	0.9	0.2	0.2	0.7	0.03	0.03
15	0.85	0	0	0.9	0.04	0.04	0.9	0.2	0.2	0.7	0.03	0.03
16	0.85	0	0	0.9	0.04	0.04	0.9	0.2	0.2	0.7	0.03	0.03
17	0.2	0	0	0.9	0.04	0.04	0.9	0.2	0.2	0.2	0.03	0.03
18	0	0	0	0.3	0.04	0.04	0.4	0.2	0.2	0.03	0.03	0.03
19	0	0	0	0.04	0.04	0.04	0.2	0.2	0.2	0.03	0.03	0.03
20	0	0	0	0.04	0.04	0.04	0.2	0.2	0.2	0.03	0.03	0.03
21	0	0	0	0.04	0.04	0.04	0.2	0.2	0.2	0.03	0.03	0.03
22	0	0	0	0.04	0.04	0.04	0.2	0.2	0.2	0.03	0.03	0.03
23	0	0	0	0.04	0.04	0.04	0.2	0.2	0.2	0.03	0.03	0.03
24	0	0	0	0.04	0.04	0.04	0.2	0.2	0.2	0.03	0.03	0.03

3.1.11. Equipment and Furniture:

(a) Equipment and furniture are necessary to make TEMF ready for daily operations. Some items are provided as integral parts of the building construction. Most furniture and equipment must be provided by others. Table 6 shows typical contract provided equipment that is needed to make TEMF ready for operations.

TABLE 6 INSTALLED BUILDING EQUIPMENT		
Area	Equipment Class <sup>1</sup>	Equipment/Furniture Item
Repair Areas	CFCI CFCI CFCI	Exhaust System Bridge Crane Compressed Air
Maintenance Areas	CFCI CFCI CFCI CFCI CFCI	Bridge Crane Maintenance Pit Compressed Air Dispensing/Disposal System Emergency Eye Wash, hand wash and shower station Fire Extinguisher Cabinets
Administration and Shop Control	CFCI CFCI	Window/Reception Counter Fire Extinguisher Cabinets
Consolidated Bench	CFCI	Compressed Air

TABLE 6 INSTALLED BUILDING EQUIPMENT		
Area	Equipment Class <sup>1</sup>	Equipment/Furniture Item
Tool Room	CFCI	
Tool Box Storage	CFCI	Window/Reception Counter
Combat Spares	CFCI	Window/Reception Counter
Latrines, Showers & Lockers	CFCI	Lockers and Benches
Break, Training, Conference Room	CFCI	Counter with Sink
Weapons & COMSEC Vaults	CFCI	Vault Door
Site	CFCI	Oil/Water Separator

Note (1): CFCI is Contractor Furnished/Contractor Installed equipment. This equipment is always MCA funded and is part of the construction contract.

(b) Furniture Systems. The following criterion describes the furnishing requirements for all room types. Furnishings, other than installed building equipment, are to be Government-furnished and Government-installed (GFGI) unless otherwise specified in this document. The following furnishings table is provided for coordination of room and office layouts to ensure suitability for their intended function.

**Table 7: Room Size and Furnishings Chart**

Table 7- Room Size and Furnishings Chart				
Room	Description	NSF	Comments	Furniture Required
Admin & Shop Control	Administration & Shop Control	Varies	OPEN-PLAN OFFICE	Systems furniture open plan office area with workstations, approx. 64 SF, with work surfaces, file drawers and overhead storage each for six staff members in Small TEMF, 16 staff members in Medium TEMF, 40 staff members in Large TEMF, and 57 staff members in Extra Large TEMF. Records section to have min. of 1 LF of 4 –drawer horizontal file cabinet for every 4 SF of room (250 SF room = min. 62.5 LF 4-drawer horizontal base files).
TRAINING ROOM	Training Room	1080	CLASSROOM	1 desk and chair for each 20 SF to accommodate min. 30 students.
BREAK ROOM/ CONF/ TRAIN	Break Room/ with adjacent Multi-purpose Space	Varies	STAFF BREAK AREA & CONFERENCE ROOM	Min. 10 LF base and wall cabinets with space for commercial grade refrigerator with ice maker. Provide seating and tables to accommodate approx. 40 percent of the building occupants.
ARMS VAULT	Class 5A Vault	300	CONSTRUCTED IN ACCORDANCE WITH AR 190-11, APP G.	1 desk to accommodate a computer, 1 task chair, 1 bookcase for manuals, one 4-drawer file cabinet, and 1 work bench.

Table 7- Room Size and Furnishings Chart				
Room	Description	NSF	Comments	Furniture Required
COMSEC VAULT	Class 5V Vault	300	CONSTRUCTED IN ACCORDANCE WITH AR 380-5.	1 desk to accommodate a computer, 1 task chair, 1 bookcase for manuals, 4 lockable metal cabinets with shelves, two 4-drawer file cabinets, industrial shelving approximately 10'wx4'dx6'h each.
COMBAT SPARES	Spare Parts	Varies	STORAGE ROOM	1 desk to accommodate a computer, 1 task chair, one 4-drawer file cabinet, and 4 lockable metal cabinets with shelves.
TOOL ROOM	Tools and Tool Set Storage	Varies	STORAGE ROOM	1 desk to accommodate a computer, 1 task chair, one 4-drawer file cabinet, and 4 lockable metal cabinets with shelves.
SECURE STOR.	Secure Storage	300	CONSTRUCTED IN ACCORDANCE WITH RISK LEVEL II ANALYSIS OF AR 190-51.	4 lockable metal cabinets with shelves and industrial shelving approximately 10'wx2'dx6'h each - 1 for small TEMF, 2 for medium, 3 for large, and 4 for extra large.
CONSOLD. BENCH REPAIR	Consolidated Bench Repair	Varies	WORK AREA	Min. 16 SF of work bench space for each assigned repair technician – 6 for small TEMF, 20 for Medium, 36 for Large, and 71 for Extra Large.

### 3.2. FUNCTIONAL AND OPERATIONAL REQUIREMENTS

(a) Small TEMF. The nominal square footage (NSF) shown for each space below is used for programming purposes, and as a basis for computing the maximum allowable gross area of the facility. The floor plan provided should be used for building layout.

SMALL TEMF					
CORE ANALYSIS BY FUNCTIONAL AREA		NUMBER OF PERSONNEL		NSF	
Administration & Shop Control		6		780	
Training Room		0		1,080	
Consolidated Bench		6		630	
Combat Spares		0		200	
Tool Room		0		200	
Tool Box Storage		0		100	
Latrine		0		1,000	
Break, Training & Conference		0		250	
Weapons Vault		0		300	
COMSEC Vault		0		300	
Secure Storage		0		300	
Telecommunications Room (NIPRNet)		0		150	
Telecommunications Room (SIPRNet)		0		150	
<b>Core Area (NSF)</b>		<b>12</b>		<b>5440</b>	
REPAIR AREA ANALYSIS BY FUNCTIONAL AREA		NUMBER OF PERSONNEL	NUMBER OF CIRCULATION AREAS	WORK AREAS (512 NSF)	NSF
<b>Repair Areas</b>					
Maintenance Areas		12	6	6	3,072
Welding Area			8	8	4,096

<b>SMALL TEMF</b>				
<b>CORE ANALYSIS BY FUNCTIONAL AREA</b>	<b>NUMBER OF PERSONNEL</b>			<b>NSF</b>
Total Work Areas			2	1,024
Circulation Area			16	8,192
Total Repair Area (NSF)		1		768
	<b>12</b>	<b>1</b>	<b>16</b>	<b>8,960</b>
<b>SHOP TOTAL</b>				
<b>Non-Assignable &amp; Utilities Factor</b>				
<b>SHOP TOTAL</b>				
<b>SHOP TOTAL (GSF)Non-Assignable &amp; Utilities Factor</b>	<b>NUMBER OF PERSONNEL</b>	<b>NUMBER OF CIRCULATION AREAS</b>	<b>WORK AREAS (512 NSF)</b>	
<b>SHOP TOTAL (GSF)</b>				<b>1.25</b>
	<b>24</b>	<b>1</b>	<b>16</b>	<b>18,000</b>
<b>FLOOR PLAN AREA SHOWN</b>				<b>18,000</b>

- (b) Not Used
- (c) Not Used
- (d) Not Used

(e) Architectural TEMF Features Matrix

ARCHITECTURAL TEMF FEATURES MATRIX	COLUMN-FREE SPACE	WIRE MESH ENCLOSURE	STUDWALL PARTITIONS	CONC/CMU IMPACT RESISTANT PARTITIONS	GYPSUM BOARD IMPACT RESISTANT PARTITIONS	WINDOWS TO REPAIR BAYS	WINDOWS TO EXTERIOR	VINYL COMPOSITION TILE	CONCRETE FLOOR HARDENER	CERAMIC TILE FLOOR	PAINTED WALLS	WALL CORNER GUARDS	FINISHED CEILING	MOISTURE RESISTANT CEILING	EXPOSED STRUCTURE OVERHEAD	CEILING HEIGHT 9 FT.	CEILING HEIGHT 12 FT.	10 TON CRANE-HOOK HEIGHT 20 FT (Note 4)	35 TON CRANE-HOOK HEIGHT 25 FT (Note 4)	OPERABLE WINDOW FOR TESTING SIGHTS	LOCKERS	OVERHEAD COILING DOORS - 10 FT. X 10 FT.	OVERHEAD COILING DOORS - 24 FT. X 14 FT. X 14 FT. THIN.	BOLLARDS @ OH DOORS INSIDE/OUTSIDE	GSA CLASS 5 VAULT DOOR	MAINTENANCE PIT	ISSUE WINDOW WITH COUNTER & COILING DOOR	BUILT-IN STORAGE BINS	
	<b>FUNCTIONAL AREAS</b>																												
ADMIN & SHOP CONTROL			1			•	•	•			•	•	•			•													
UNASSIGNED			1			•	•	•			•	•	•			•													
TOOL ROOM		3			•				•		•	•	•					•									•	•	
TOOL BOX STORAGE		3			•				•		•	•	•					•									•	•	
COMBAT SPARES		2			•				•		•	•	•					•								•	•		
LATRINES, SHOWERS, LOCKERS					•					•	•	•	•			•					•							•	•
TRAINING ROOM			•				•	•			•	•	•			•													
BREAK, TRAINING & CONF			•				•	•			•	•	•			•													
CONSOLIDATED BENCH REPAIR				•					•		•	•	•					•				•							
WEAPONS STORAGE VAULT		2		•					•		•	•	•			6	•									•			
COMSEC VAULT		2		•					•		•	•	•			6	•									•			
NONSENSITIVE SECURE STORAGE				•					•		•	•	•				•												
COMMUNICATION VEHICLE DOCK																													
CORRIDOR				•				5			•	•	•			•													
MECHANICAL ROOM				•					•		•	•	•					•											
ELECTRICAL ROOM				•					•		•	•	•					•											
COMMUNICATIONS ROOM				•					•		•	•	•					•											
SIPRNet ROOM									•		•	•	•					•											
FLUID DISTRIBUTION									•		•	•	•									9		•					
REPAIR AREAS	•								•		•	•	•			•		•	•				•	•					
MAINTENANCE AREAS	•								•		•	•	•		8		•	•					•	•		•			
HARDSTAND																													
ORG STORAGE	•	•							•		•	•	•									•							
UAV MAINT. AND STORAGE BUILDING	•								•		•	•	•										•						
DISTRIBUTION COMPANY SUPPLY BLDG	•	•	•						•		•	•	•									•							
HAZ WASTE & POL STORAGE BUILDINGS	•	•							•		•	•	•									•							

**Notes for Architectural TEMF Features Matrix**

1. Lightweight, non-bearing partitions removable to rearrange space
2. Wire mesh partitions to subdivide where required
3. Wire mesh enclosed for tool storage to facilitate interaction of mechanics and tool room keeper, and for relocation flexibility.

4. Provide either a 10-ton or a top running, 35-ton, bridge crane for one wing of repair areas and maintenance areas as noted in para. 2.1.
5. VCT in corridor on 2<sup>nd</sup> Floor (except Small TEMF).
6. Concrete roof caps are required for both COMSEC and Arms Vaults; a secondary ceiling may be provided in these areas as noted. Vault caps shall not be left exposed to view from adjacent spaces. Tops of vault caps must be rendered as lockable access only (i.e. accessibility to mechanical ductwork or in-line fans).
7. All Finishes are considered minimum finishes only.
8. The Maintenance Corridor through the Core Area shall have a minimum 14'-0" clear Ceiling Height.
9. Roll-up doors or double doors may be provided for exterior access to the Fluid Distribution Room based on User preference.

(f) Mechanical TEMF Features Matrix

MECHANICAL TEMF FEATURES MATRIX	HVAC	HEAT	VENTILATE	AIR CONDITION	VEHICLE EMISSIONS EXHAUST SYSTEM	PLUMBING & FIRE PROTECTION	LAVATORY OR SINK	HOSE BIBB	WASH FOUNTAIN	WATER CLOSET	URINAL	SHOWERS	COMPRESSED AIR	EMERGENCY SHOWER & EYEWASH	SPRINKLER SYSTEM	TRENCH DRAIN AT DOORS	FLOOR DRAIN	MISCELLANEOUS	STEAM CLEANING FOR PARTS/ENGINES	WELDING AND/OR MACHINIST AREA	POL DISPENSING HOSE WITH REEL SYSTEM	ENVIRONMENTAL	OUT OF SPEC WASTE FUEL STORAGE	WASTE OIL STORAGE	WASTE ANTIFREEZE STORAGE/RECYCLE		
	FUNCTIONAL AREAS																										
ADMIN & SHOP CONTROL		•		•											•												
UNASSIGNED		•		•											•												
TOOL ROOM		•		•											•												
TOOL BOX STORAGE		•		•											•												
COMBAT SPARES		•		•											•												
LATRINES, SHOWERS, LOCKERS		•	•	•			•	•	8	•	•	•			•		•										
TRAINING ROOM		•		•											•												
BREAK, TRAINING & CONF		•		•			•								•												
CONSOLIDATED BENCH REPAIR		•		•									•	•	•		7										
WEAPONS STORAGE VAULT		•		•											•												
COMSEC VAULT		•		•											•												
NONSENSITIVE SECURE STORAGE		•	•												•												
COMMUNICATION VEHICLE DOCK																											
CORRIDOR		•		•											•												
MECHANICAL ROOM		4	•				•								•		•										
ELECTRICAL ROOM		4	•												•												
COMMUNICATIONS ROOM				•											•												
SIPRNet ROOM				•											•												
FLUID DISTRIBUTION		•	•				•					•	•	•	•												
REPAIR AREAS		•	•	•			•	8				•	•	•	•	•	7		5	1			3	3	3		
MAINTENANCE AREAS		•	•		6		•					•	•	•	•	•	7				•		3	3	3		
HARDSTAND																											
ORG STORAGE		4	•												•												
UAV MAINT. AND STORAGE BUILDING		•	•												•												
HAZ WASTE & POL STORAGE BUILDINGS				•											•												
DISTRIBUTION COMPANY STORAGE FAC		•	•												•												

Notes for Mechanical TEMF Features Matrix

1. Welding exhaust system in one pair of repair areas. This area will also accommodate machinist function.
2. Not Used
3. Provide secondary containment in tanks outside of building.
4. Heat for freeze protection only.
5. Provide water and power connections for hook-up of user procured (GFGI) portable steam cleaner for cleaning of engines and engine components in a pair of repair areas.
6. Provide non-sparking explosion proof exhaust from pit.
7. Convey waste water through an oil/water separator prior to discharge to sanitary sewer.

8. Provide wash fountain in 8 FT circulation bay adjacent to the core area, or outside the latrines in the core area as shown on the drawings.

(g) Electrical TEMF Features Matrix

ELECTRICAL/ TELECOMMUNICATIONS TEMF FEATURES MATRIX	POWER	28V DC	120V SINGLE PH	208V SINGLE PH	208-230V 3 PH	208V-400 HZ	208V, 3PH, 50 HZ	FILTERED POWER	GROUND BUSBAR ON WALL	GROUNDING POINTS IN FLR OR HARDSTAND	COMMUNICATIONS	TELEPHONE	DATA CONNECTION	INTERCOMPAGING/MASS NOTIFICATION	INTRUSION DETECTION SYSTEM	PANABLE ZOOM CAMERA	CATV	LIGHTING	FLUORESCENT	(HID) METAL HALIDE	EXPLOSION PROOF FLUORESCENT	(HID) HIGH PRESSURE SODIUM
	FUNCTIONAL AREAS																					
ADMIN & SHOP CONTROL			•									•	•	•			•		•			
UNASSIGNED			•									•	•	•			•		•			
TOOL ROOM			•		12							•	•	•			•		•			
TOOL BOX STORAGE			•									•	•	•			•		•			
COMBAT SPARES			11									•	•	•			•		•			
LATRINES, SHOWERS, LOCKERS			•									•	•	•			•		•			
TRAINING ROOM			•									•	•	•			•		•			
BREAK, TRAINING & CONF			•									•	•	•			•		•			
CONSOLIDATED BENCH REPAIR		•	•					•	•			•	•	•			•		•			
WEAPONS STORAGE VAULT			•									•	•	•	•		•		•			
COMSEC VAULT			•						•			•	•	•	•		•		•			
NONSENSITIVE SECURE STORAGE			•									•	•	•			•		•			
COMMUNICATION VEHICLE DOCK			•		5				•			•	•	•			•		•			
CORRIDOR			•									•	•	•			•		•			
MECHANICAL ROOM			•									•	•	•			•		•			
ELECTRICAL ROOM			•									•	•	•			•		•			
COMMUNICATIONS ROOM			•						•			•	•	•			•		•			
SIPRNet ROOM			•						•			•	•	•	•		•		•			
FLUID DISTRIBUTION			•									•	•	•			•		•			
REPAIR AREAS	1	•	•	10	6	4		•	•			•	•	•	7		•		•			
MAINTENANCE AREAS		•	•	•	6	4		•	•			•	•	•	7		•		•		8	
HARDSTAND				2	3					•		•	•	•			•		•			
ORGANIZATIONAL STORAGE			•									9					•		•			
UAV MAINT & STORAGE BLDG		•	•						•			•	•	•			•		•			
HAZ WASTE & POL STORAGE BUILDINGS			•									•	•	•			•		•			
DISTRIBUTION COMPANY STORAGE BLDG			•									9					•		•			

Notes for Electrical TEMF Features Matrix

1. Provide power connections for hook-up of user procured (GFGI) portable steam cleaner for cleaning of engines and engine components in a pair of repair areas. Coordinate power requirements with the User.
2. MILVANS (100A), TOE vans (50A), Hospital (100A, 208V, 3-PH, 5-Wire).
3. LCSS Vans (to be discontinued in future), Patriot Missile Units.
4. For Engineers shop.
5. Communications Vans (100A).

6. Hospital units require 120/208V, 3-PH, 5-Wire connection
7. Provide power and conduit and wiring system(s) for user provided panable zoom camera system; monitored in Admin and Shop Control.
8. Lighting classification for pit lighting shall be determined during the design.
9. Provide 1-4" conduit with a 6 pair copper cable to the Distribution Company

Storage and Organizational Storage Buildings from the main communications room in the TEMF. Conduit and cable routing may be to the nearest telecommunications maintenance hole before routing cable back to the TEMF main communications room. Provide Protected Entrance Terminal (PET) with one 110 type block mounted on a 4 ft by 8 ft backboard mounted vertically. Backboard treatment shall be in accordance with I3A. Provide one wall mounted telephone outlet inside the building. Ground PET in accordance with 250.50 and 800.100 of NFPA 70 National Electrical Code.

10. Provide 208V single phase power in all Repair Areas and with weather proof connection for tire changing machine where shown on the TEMF Standard Drawings.

#### 11. ASLMS Containers

a) The ASLMS Container is provided with the following:

1) Each ASLMS container comes with a set of two – 150 foot cables with each end plug identical. MS part number for the plug used on cable is MS3456W16-10P.

2) Electrical circuit is 20 ampere, 120 volt, single phase.

b) Provide the following power provisions for each ASLMS container:

1) Two dedicated 20 ampere, 120 volt, single phase circuits with a special receptacle for each circuit. MS part number for special receptacle to be provided is MS3451W16-10S.

#### 12. SATS Containers

a) The SATS Container is provided with the following:

1) Integrated 10 KW generator (208V, 3 phase 60 Hz)

2) A wall mounted 100 Amp, 208 volt, 3-phase, 60 Hz AC conforming to MIL-C-22992, Class L, Style P comprised of a MS90558 C 44 4 shell, with an MS14055 insert having insert arrangement 44-12, along with a MS90564 44 C weather-tight cover.

3) Signal entry panel (SEP) with the following connections: RS 232 Male/Female small and large, RJ 11 (phone), RJ 45 (LAN), 10 Base 2 (BNC), and 10 Base T (Ethernet).

b) Provide the following power and data provisions for each SATS container:

1) A branch circuit sized to the full load capacity of the 10kw generator to a weatherproof wall mounted 100 amp disconnect switch located within the cable's reach.

2) A pre-manufacturer cable, stock number 5995-01-435-8697. This cable is 50 foot long with a plug for the SATS receptacle at one end and terminal connections on the other end. Connect the cable's terminal ends to the disconnect switch. Provide a means to hang the cable.

3) A weatherproof RJ 45 (phone) and RJ 45 (LAN) outlet with the conduit and cables (Category 6) to the Communication Room and connect per I3A requirements. Provide 50 feet of exterior cable with appropriate connectors on each end for each outlet. Provide a means to hang the cables.

#### 3.3. References

- (1) 40 CFR 261, Identification and Listing of Hazardous Waste
- (2) 40 CFR 262, Standards Applicable to Generators of Hazardous Waste
- (3) 40 CFR 264, Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
- (4) American Society of Mechanical Engineers (AMSE)  
ASME HST-1, Performance Standard for Electric Chain Hoists  
ASME HST-4, Performance Standard for Overhead Electric Wire Rope Hoists
- (5) ANSI Z358.1, American National Standard for Emergency Eyewash and Shower Equipment
- (6) Not used.
- (7) AR 190-11, Physical Security of Arms, Ammunition, and Explosives (FOUO)

- (8) AR 190-51, Security of Unclassified Army Property (Sensitive and Nonsensitive)
- (9) AR 380-5, Department of the Army Information Security Program
- (10) Crane Manufacturers Association of America (CMAA)

CMAA 70, Top Running and Bridge and Gantry Type Multiple Girder Electric Overhead Traveling Cranes, No. 70  
CMAA 74, Top Running and Under Running Single Girder Electric Overhead Cranes  
Utilizing Under Running Trolley Hoist, No. 74

- (11) Fed Spec AA-V-2737, Modular Vault Systems
- (12) TM 5-853-1, Security Engineering Project Development (FOUO)
- (13) UFC 3-550-3, Design: Electrical Power Supply and Distribution
- (14) AR 380-40, Policy for Safeguarding and Controlling Communications Security (COMSEC) Material (FOUO).
- (15) USACE STD 872-90-03, FE6 Chain-Link Security Fence Details



#### 4.0 APPLICABLE CRITERIA

Unless a specific document version or date is indicated, use criteria from the most current references as of the date of issue of the contract or task order, including any applicable addenda, unless otherwise stated in the task order. 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**

<b>Air Conditioning and Refrigeration Institute (ARI)</b>	
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
<b>Air Movement and Control Association (AMCA)</b>	
AMCA 210	Laboratory Methods of Testing Fans for Rating
<b>American Architectural Manufacturers Association (AAMA)</b>	
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
<b>American Association of State Highway and Transportation Officials (AASHTO)</b>	
	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
<b>American Bearing Manufacturers Association (AFBMA)</b>	
AFBMA Std. 9	Load Ratings and Fatigue Life for Ball Bearings
AFBMA Std. 11	Load Ratings and Fatigue Life for Roller Bearings
<b>American Boiler Manufacturers Association (ABMA)</b>	
ABMA ISEI	Industry Standards and Engineering Information
<b>American Concrete Institute</b>	
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
<b>ADA Standards for Accessible Design</b>	
See US Access Board	ADA and ABA Accessibility Guidelines for Buildings and Facilities, Chapters 3-10.
<b>American Institute of Steel Construction (AISC)</b>	
	Manual of Steel Construction – 13 <sup>th</sup> Edition (or latest version)
<b>American Iron and Steel Institute</b>	
AISI S100	North American Specification for the Design of Cold-Formed Steel Structural Members
<b>American National Standards Institute 11 (ANSI)</b>	

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
<b>American Society of Civil Engineers (ASCE)</b>	
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]
<b>American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE)</b>	
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

<b>American Society of Mechanical Engineers International (ASME)</b>	
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
<b>American Water Works Association (AWWA)</b>	
	Standards [standards for water line materials and construction]
<b>American Welding Society</b>	
	Welding Handbook
	Welding Codes and Specifications (as applicable to application, see International Building Code for example)
<b>Architectural Woodwork Institute (AWI)</b>	
Version 1.2	AWI Quality Standards 7th Edition
<b>Associated Air Balance Council (AABC)</b>	
AABC MN-1	National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems
	AABC Associated Air Balance Council Testing and Balance Procedures
<b>ASTM International</b>	
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
<b>Builders Hardware Manufacturers Association (BHMA)</b>	
ANSI/BHMA	American National Standards for Builders Hardware

<b>Building Industry Consulting Service International</b>	
	Telecommunications Distribution Methods Manual (TDMM)
	Customer-Owned Outside Plant Design Manual (CO-OSP)
<b>Code of Federal Regulations (CFR)</b>	
49 CFR 192	Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards
10 CFR 430	Energy Conservation Program for Consumer Products
<b>Consumer Electronics Association</b>	
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
<b>Electronic Industries Association (EIA)</b>	
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
<b>Federal Highway Administration (FHWA)</b>	
	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
<b>Illuminating Engineering Society of North America (IESNA)</b>	
IESNA RP-1	Office Lighting

IESNA RP-8	Roadway Lighting
IESNA Lighting Handbook	Reference and Application
<b>Institute of Electrical and Electronics Engineers Inc. (IEEE)</b>	
	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
<b>International Code Council (ICC)</b>	
IBC	<p>International Building Code</p> <p>Note: All references in the International Building Code to the International Electrical Code shall be considered to be references to NFPA 70.</p> <p>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.</p> <p>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.</p>
IMC	<p>International Mechanical Code –</p> <p>Note: For all references to “HEATING AND COOLING LOAD CALCULATIONS”, follow ASHRAE 90.1</p> <p>Note: For all references to “VENTILATION”, follow ASHRAE 62.1</p>
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, Liquefied Petroleum Gas Code.
<b>International Organization for Standardization (ISO)</b>	
ISO 6781:1983	Qualitative detection of thermal irregularities in building envelopes –

	infrared method
<b>LonMark International (LonMark)</b>	
LonMark Interoperability Guidelines	(available at <a href="http://www.lonmark.org">www.lonmark.org</a> ), including: Application Layer Guidelines, Layer 1-6 Guidelines, and External Interface File (XIF) Reference Guide
LonMark Resource Files	(available at <a href="http://www.lonmark.org">www.lonmark.org</a> ), including Standard Network Variable Type (SNVT) definitions
<b>Metal Building Manufacturers Association (MBMA)</b>	
	Metal Building Systems Manual
<b>Midwest Insulation Contractors Association (MICA)</b>	
	National Commercial and Industrial Insulation Standards Manual
<b>National Association of Corrosion Engineers International (NACE)</b>	
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
<b>National Electrical Manufacturers Association (NEMA)</b>	
<b>National Environmental Balancing Bureau (NEBB)</b>	
	Procedural Standards Procedural Standards for Testing Adjusting Balancing of Environmental Systems
<b>National Fire Protection Association (NFPA)</b>	
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
<b>National Roofing Contractor's Association (NRCA)</b>	
	Roofing and Waterproofing Manual
<b>National Sanitation Foundation, International</b>	
NSF/ANSI Std. 2, 3, 4, 5, 6, 7, 8, 12, 13, 18, 20, 21, 25, 29, 35, 36, 37, 51, 52, 59,	Food Equipment Standards

169	
ANSI/UL Std. 73, 197, 471, 621, 763	Food Equipment Standards
CSA Std. C22.2 No. 109, 120, 195	Food Equipment Standards
<b>Occupational Safety and Health Administration (OSHA)</b>	
Title 29, Part 1926	OSHA Construction Industry Standards, Title 29, Code of Federal Regulations, Part 1926, Safety and Health Regulations for Construction
<b>Plumbing and Drainage Institute (PDI)</b>	
PDI G 101	Testing and Rating Procedure for Grease Interceptors with Appendix of Sizing and Installation Data
PDI WH201	Water Hammer Arrestors
<b>Precast Concrete Institute</b>	
PCI Design Handbook	Precast and Prestressed Concrete
<b>Sheet Metal and Air Conditioning Contractor's National Association (SMACNA)</b>	
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
<b>State/Local Regulations</b>	
	State Department of Transportation Standard Specifications for Highway and Bridge Construction
	Sedimentation and Erosion Control Design Requirements
	Environmental Control Requirements
	Storm Water Management Requirements
<b>Steel Door Institute (SDI)</b>	

ANSI A250.8/SDI 100	Standard Steel Doors and Frames
<b>Steel Deck Institute</b>	
	SDI Diaphragm Design Manual
<b>Steel Joist Institute</b>	
	Catalog of Standard Specifications and Load Tables for Steel Joists and Joist Girders
<b>Underwriters Laboratories (UL)</b>	
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
<b>UNITED STATES ACCESS BOARD: U.S. ARCHITECTURAL AND TRANSPORTATION BARRIERS COMPLIANCE BOARD</b>	
ADA and ABA Accessibility Guidelines for Buildings and Facilities	<p>ABA Accessibility Standard for DoD Facilities</p> <p>Derived from the ADA and ABA Accessibility Guidelines: Specifically includes: ABA Chapters 1 and 2 and Chapters 3 through 10.</p> <p>Use this reference in lieu of IBC Chapter 11.</p> <p>Excluded are:</p> <p>(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).</p> <p>(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).</p>
<b>U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES</b>	
	FDA National Food Code
<b>U.S. GREEN BUILDING COUNCIL (USGBC)</b>	
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: [DetrickSECI3Aguide@conus.army.mil](mailto:DetrickSECI3Aguide@conus.army.mil)
- 4.2.11. U.S. Army Information Systems Engineering Command (USAISEC) TG for the Integration of SECRET Internet Protocol (IP) Router Network (SIPRNET). See Paragraph 3 for applicability to specific facility type. May not apply to every facility. This is mandatory criteria for those facilities with SIPRNET.

## 5.0 GENERAL TECHNICAL REQUIREMENTS

This paragraph contains general technical requirements. See also Paragraph 3 for facility-specific 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 expectancy 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.

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: Each building shall have exterior signage permanently attached on two faces of the 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. Coordination of the building colors and finishes is necessary for a cohesive design. Color selections shall be appropriate for the building type. The use of color, texture and pattern shall be used 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. Finishes should be selected with regards to aesthetics, maintenance, durability, life safety and image. Limit the number of similar colors for each material. Color of Ceramic and porcelain tile grout shall be medium range color to help hide soiling. Plastic laminate and solid surface materials shall have patterns that are mottled, flecked or speckled. Finish colors of fire extinguisher cabinets, receptacle bodies and plates, fire alarms / warning lights, emergency lighting, and other miscellaneous items shall be coordinated with the building interior. Color of equipment items on ceilings (speakers, smoke detectors, grills, etc.) shall match 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: Interior window treatments with adjustable control shall be provided in all exterior window locations for control of day light coming in windows or privacy at night. Uniformity of treatment color and material shall be maintained to the maximum extent possible within a building.

#### 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.

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. See Section 01 33 16 for FFE design procedures.

#### 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 needs to be compatible with the intended functions and components that allows for future flexibility and reconfigurations of the interior space. 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. 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"

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.

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.m<sup>2</sup> @ 75 Pa) when tested in accordance with ASTM E 2178

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

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

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

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

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

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

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

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

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

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

(a) Test the completed building and demonstrate that the air leakage rate of the building envelope does not exceed 0.25cfm/ft<sup>2</sup> at a pressure differential of 0.3" w.g.(75 Pa) in accordance with ASTM's E 779 (2003) or E-1827-96 (2002). Accomplish tests using either pressurization or depressurization or both. Divide the volume of air leakage in cfm @ 0.3" w.g. (L/s @ 75 Pa) by the area of the pressure boundary of the building, including roof or ceiling, walls and floor to produce the air leakage rate in cfm/ft<sup>2</sup> @ 0.3" w.g. (L/s.m<sup>2</sup> @ 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.

(b) 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.

(c) 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, the design for underslab piping systems and underground piping serving chillers, cooling towers, etc, shall include features 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, piping should be suspended 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 vitreous china, wall-mounted, wall outlet, non-water using, with integral drain line connection, and with sealed replaceable cartridge or integral liquid seal trap. Either type shall use a biodegradable liquid to provide the seal and maintain a sanitary and odor-free environment. Install, test and maintain in accordance with manufacturer's recommendations. Slope the sanitary sewer branch line for non-water use urinals a minimum of 1/4 inch per foot. Do not use copper tube or pipe for drain lines that connect to the urinal. Manufacturer shall provide an operating manual and on-site training to installation operations personnel for the proper care and maintenance of the urinal. For complexes, non-water using urinals are not required for barracks type spaces.

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

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

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

## 5.7. 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:** The project's facilities must connect 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 cutoff type exterior luminaries.

5.7.6. **TELECOMMUNICATION SYSTEM:** All building telecommunications cabling systems (BCS) and OSP telecommunications cabling system shall conform to APPLICABLE CRITERIA to include 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. 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.

5.8.2.2. Design systems in geographical areas that meet the definition for high humidity in UFC 3-410-01FA in accordance with the special criteria for humid areas therein.

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

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

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

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

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

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

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

- (a) Install hardware such that individual control equipment can be replaced by similar control equipment from other equipment manufacturers with no loss of system functionality.
- (b) Necessary documentation (including rights to documentation and data), configuration information, configuration tools, programs, drivers, and other software shall be licensed to and otherwise remain with the Government such that the Government or its agents are able to perform repair, replacement, upgrades, and expansions of the system without subsequent or future dependence on the Contractor.

5.8.3.2. All DDC Hardware shall:

- (a) Be connected to a TP/FT-10 ANSI/EIA 709.3 control network.
- (b) Communicate over the control network via ANSI/EIA 709.1B exclusively.
- (c) Communicate with other DDC hardware using only SNVTs
- (d) Conform to the LonMark® Interoperability Guidelines.
- (e) Be locally powered; link power (over the control network) is not acceptable.
- (f) Be fully configurable via standard or user-defined configuration parameter types (SCPT or UCPT), standard network variable type (SNVT) network configuration inputs (*nci*), or hardware settings on the controller itself to support the application. All settings and parameters used by the application shall be configurable via standard or user-defined configuration parameter types (SCPT or UCPT), standard network variable type (SNVT) network configuration inputs (*nci*), or hardware settings on the controller itself
- (g) Provide input and output SNVTs required to support monitoring and control (including but not limited to scheduling, alarming, trending and overrides) of the application. Required SNVTs include but are not limited to: SNVT outputs for all hardware I/O, SNVT outputs for all setpoints and SNVT inputs for override of setpoints.
- (h) To the greatest extent practical, not rely on the control network to perform the application..

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

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

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

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

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

5.8.3.8. Not Used

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

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

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

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

**Table 5-1: QC Checklist**

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

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

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

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

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

5.8.5. COMMISSIONING: Commission all HVAC systems and equipment, including controls, and all systems requiring commissioning for LEED Enhanced commissioning, in accordance with ASHRAE Guideline 1.1, ASHRAE Guideline 0 and LEED. Do not use the sampling techniques discussed in ASHRAE Guideline 1.1 and in ASHRAE Guideline 0. Commission 100% of the HVAC controls and equipment. Hire the Commissioning Authority (CA), certified as a CA by AABC, NEBB, or TABB, as described in Guideline 1.1. The CA will be an independent subcontractor to the contractor and not an employee or subcontractor of any other subcontractor on this project. The CA will not have business connections with any other party on the project. The CA will not have any other role or responsibilities outside of commissioning activities. The CA will communicate and report directly to the Government in the execution of the 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 three 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.

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. 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 track 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
- (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, utility service lines and connections (electrical, communications, cable, water, sewer, stormwater, gas, mechanical), etc.

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:

- (a) Exterior seating at Battalion Headquarters is preferred. Do not fabricate seating and tables of wood.
- (b) Bicycle racks at all regularly occupied facilities with rack capacities consistent with LEED credit requirements. Provide racks fabricated of corrosion resistant materials. Place all bike racks outside of the unobstructed space per UFC 4-010-1. Racks shall be mounted on concrete pads and anchored into the pad.
- (c) Fencing as indicated for security or safety barriers. Fencing shall be galvanized, vinyl coated, or aluminum-coated, chain-link.
- (d) Physical barriers, including concrete filled steel pipe bollards and vehicle gates, as required by antiterrorism or traffic control design.
- (e) Fabricate waste receptacles of durable, corrosion-resistant materials.
- (f) Flagpoles are required at BNHQ 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.

##### 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. Design and size stormwater facilities to accommodate stormwater runoff from all site development surfaces and all runoff from buildings.
- (b) JBLM prefers stormwater infiltration methods that are small and distributed throughout the project site and less visually obtrusive. Preferred methods may include use of such elements as car parks, rain garden, porous pavement, and underground filtration systems.
- (c) The use of underground injection to manage stormwater runoff must be in accordance with Chapter 173-218 WAC. New injection facilities must meet the non-endangerment standard as defined in the WAC and be registered with the State through the JBLM Stormwater Office prior to being constructed.

- (d) If underground injection is going to be used to manage stormwater, comply with the DOE's *Guidance for UIC Wells that Manage Stormwater* (latest edition).
- (e) Where low-impact development techniques are used, comply with the *Low Impact Development Technical Guidance Manual for Puget Sound*.

(f) Utilize the Western Washington Stormwater Management Manual prepared by Washington State Department of Ecology for stormwater management. It can be located on their website at HYPERLINK "<http://www.ecy.wa.gov/programs/wq/stormwater/manual.html>"<http://www.ecy.wa.gov/programs/wq/stormwater/manual.html>

#### 6.3.3.2. Erosion and Sediment Control

Nothing to input

#### 6.3.3.3. Vehicular Circulation.

The Contractor will be responsible for parking lots for the facilities. POV parking requirements are shown in the Drawings.

### 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. The Contractor shall be responsible to obtain corrected survey data from any subsequent changes from the time the survey information was obtained to the present. Contractor will field verify surface and utility elevations. Use NAVD 88 datum for the vertical datum. 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. 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 basis of design for fire flow and domestic water supply requirements.

6.4.3.1. See Appendix D for results of fire flow tests to use for basis of design for fire flow and domestic water supply requirements.

6.4.3.2. Anticipated water service connection points are identified in the Appendices.

6.4.3.3. The installation has recently experienced loss of water pressure and adequate supplies are suspect in many locations. Sufficient water supply may not be available for this project. See hydrant flow test information provided in Appendix D, but may not be indicative of the actual flow. Repairs to all reservoirs are ongoing, and anticipated for next two years that require the post to empty the tanks. No more than two are authorized to be emptied at a time.

#### 6.4.4. Pavement Engineering and Traffic Estimates:

The Contractor will be responsible for all roadway improvements and parking lots for the facilities. 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 JBLM Master Plan

(standard width for planting strip is 15' with street trees at 20-30' on center and the standard width for sidewalks is 6', unless otherwise required by the JBLM Master Plan)

6.4.5. Traffic Signage and Pavement Markings: Provide marked bike lanes on all roads per locations identified on the JBLM Master Plan.

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, the 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-inch 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 detention by JBLM. Hardwire the meter connections to the DDC/BAS/USMC to the DDC system; don't use the wireless type.

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

(c) Telecommunications: The National Enterprise Center (NEC), operates the Army communications system at Fort Lewis. Point of Contact: Gary Schroeder; 253-967-3870.

(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: Scott Morrison, Engineering Construction Coordinator, Comcast Cable, 410 Valley Avenue NW, Building C, Puyallup, WA 98371, 253-864-4350.

(f) Qwest provides local telephone service at JBLM. Point of Contact: Robert Blair, Senior Design Engineer, Qwest Communications, 2410 South 84th Street, Suite 18, Lakewood, WA 98499, 253-597-5192

(g) Exterior Utility Installation: Where new utilities cross roads, driveways, and parking lots to be paved under this contract, install utilities prior to paving. If paving has occurred prior to installing the utilities, jacking or boring is required. It is preferred to jack and bore utilities under all existing paved roads, but open cut excavation is allowed if the pavement cut width is a minimum of 15-feet wide across the entire width of the road. Install new utilities that connect to existing utilities located under existing paved areas by open cut excavation. A minimum 15-foot pavement cut width is required for all open cut excavations.

6.4.6.2. Sanitary Sewer Service

(a) General: To demonstrate the integrity of the installed material and construction procedures, the Contractor shall conduct final air testing after the finished grading, landscaping, and paving is accomplished; all other underground utilities have been installed; and the lines have been flushed, cleaned, deflection tested, and television inspected. For ductile iron pipe, the testing shall be in accordance with the applicable requirements of ASTM C 924. 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. The Contractor may be required to retest the system if warranted by the contracting agency.

(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 VHS videotapes to the Contracting Officer.
- (d) Not Used
- (e) Install a boot/equipment wash system. 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 installation of water system to provide for domestic use and required hydrant flow to meet NFPA 24 and NFPA13. NFPA 13 requires clearances around the main riser to prevent damage of piping subjected to earthquakes. Provide water service and fire lines of ductile-iron pipe or polyvinyl chloride (PVC) plastic water main pipe. Provide water service appurtenances as required. Do not install utilities under the footprint of a building. Supply a fire-line off the domestic water system with PIV with tamper switch per NFPA 24 standards to supply the building's interior fire suppression system.
- (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
- (1) Backflow Prevention Assemblies shall be approved by the Washington State Department of Health (DOH) for installation in Washington State. The most current list of approved assemblies is available from the DOH test reports, showing 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 breaker 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 State.
- (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) All fire hydrants will be center stem-dry barrel, and paint the barrels nutmeg brown. PANTONE 18-1222 PTX. Install hydrants with 6-inch shutoff gate valve for easy maintenance and service. Fit fire hydrants with 5-inch Stortz adapters. Provide a fire department connection within 150 feet of a fire hydrant and install a PIV valve. Hydrants shall not be further than 40 feet from the building, and no closer than 25 feet. Locate them not less than 3 feet and no more than 7 feet from a paved traffic rated surface. Do not locate closer than 10 feet to any obstruction or near an entranceway. Install the suction connection perpendicular to the nearest roadway.
- (e) The flow tests were conducted in the vicinity of the project sites and can be found in Appendix D. Any additional flow testing will be the responsibility of the Contractor, if deemed necessary and for the portion of their respective development activity. Conduct any additional water flow testing in accordance with NFPA 291, Recommended Practice for Fire-Flow Testing and Marking of Hydrants. Hydrant barrel shall be collared with two reflective metal backed collars and numbered 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) If not already in place, secure a blue double-sided reflectorized raised pavement marker in the road 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 from each. Submit hydrant test and installation report to the Contracting Officer (to be forwarded to the installation water systems manager).
- (g) All water meters shall be read in U.S. gallons, have frost protection design if appropriate, shall have bronze casing when available, 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
- (h) Meter boxes shall be concrete with cast-iron lid and cast-iron meter reader lid. Use plastic boxes and lids in unpaved areas or grass areas not subject to vehicular traffic.
- (i) Water Systems – North Fort: Battalion Headquarters B: The water mains are currently under construction and will be in place to make lateral connections. Coordinate with the Contracting Officer to obtain up-to-date plans during the design phase.
- (j) Water Systems – Jackson: Battalion Headquarters A and B: Extend service from the existing water main in Evergreen. Lawnmower Storage Buildings: Water is not supplied to Lawnmower Storage Buildings (LSB's).

#### 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. JBLM owns and operates the propane fuel distribution system. 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.
- (c) Propane Fuel Distribution System: JBLM owns and operates the propane 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. In addition, install yellow pipe with black striping in order to further 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 next to existing or proposed sidewalks, pathways, or parking areas to eliminate the need to construct additional hard surface access. 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. Obtain borrow material from licensed and permitted sources off government property. Obtain all fill off post and at their expense. 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 its original condition after construction is complete.

#### 6.4.10. Clearing and Grubbing:

(a) Clear and grub all trees and vegetation necessary for construction, but save as many healthy trees as possible. Consider alternatives of the site orientation to preserve existing trees. Unless otherwise noted, a qualified tree specialist (International Society of Arboriculture (ISA) Certified Arborist, urban forester, or horticulturist) shall determine the health and safety of trees. 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 UFGS 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 removed during construction 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 unmerchantable (slash). Whenever possible, do not cut trees into log lengths. If trees are too large to be handled tree 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 PW, Engineering and Contract Management Division. 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 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 being removed from the site for storage. Preferred lengths are as follows: 41'-10", 38'-10", 36'-10", or 32'-10". Acceptable lengths include 2-foot multiples less than 32'-10" down to 16'-10". Merchandise all logs down to a 4-inch top. Merchandise 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 original ground surface. If the stump is within the drip-line of a preserved tree, grind the tree stump to grade level only. Fill depressions made by grubbing with suitable material and compact to make the surface conform to the original adjacent surface.

#### 6.4.11. Landscaping:

The Contractor is responsible for the landscaping within the project construction limits

6.4.11.1. Tree Preservation Plan: Provide a Tree Preservation and Protection Plan to COE for approval before any clearing and grading can take place. The Tree Preservation Plan must follow JBLM' Urban Forest Management requirements included in Appendices P and Q.

Replace oak trees that cannot be preserved at the ratio of six new to every one removed. Contact the Contracting Officer for guidance on locations for planting new oak trees.

6.4.11.2. Existing Plant Materials: Retention of existing plant materials, particularly mature trees, is preferred. Protect the root zone and foliage of materials being retained. Where trees and other vegetation must be cleared from a site, mark trees and confirm planned clearing with Contracting Officer prior to cutting.

6.4.11.3. New Plant Materials: Only use of drought tolerant, insect and disease resistant species native to western Washington is authorized. Provide trees, shrubs, groundcovers and grasses consistent with existent plantings. Minimize the use of ornamental turf areas. Review Appendix I for lists of acceptable and prohibited plant materials. 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 State for a period of one growing season.
- (c) Low-maintenance varieties without significant pruning and thinning requirements.
- (d) Supplemental irrigation is acceptable for turf varieties used at lawns and training areas.

(e) Plant trees and shrubs in locations that will avoid contact with building when mature.

6.4.11.4. Warranty. Guarantee furnished plant material to be in a vigorous growing condition for a period of 12 months regardless of the contract time period. Replace a plant one time under this guarantee. Transplanting existing plants requires no guarantee.

6.4.11.5. 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 nonvegetative 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) Concrete mow strips to separate lawn areas from shrub beds and gravel beds.
- (e) Mulch at all shrub beds.

6.4.11.6. Irrigation Systems: Where plant materials selected require permanent irrigation, provide irrigation that is consistent with project sustainability goals and installation water conservation initiatives, exposure, and service. Where xeriscape planting is developed, provide temporary irrigation necessary to maintain plant materials until established. Provide supplemental irrigation during plant establishment periods.

(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 plastic pipe (Schedule 40) or polyethylene plastic pipe. Use overhead spray (gear or rotor) heads at lawn areas and drip or bubbler hoses or heads at tree, shrub, and groundcover beds.

(d) Irrigation Capacity: Sufficient to maintain 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: Enough water to soak soil to depth of 6 inches at each application; intermittent applications, if necessary, to avoid saturation to runoff; adjustable for less water on damp soil.
- (3) Irrigation Efficiency: 55 percent, minimum, of applied water actually reaching plants, under normal wind conditions.
- (4) Locations of Irrigation Equipment: To provide complete coverage of landscaped area requiring irrigation, without overspray or runoff onto pavements, buildings, or unirrigated planted areas.
- (5) Variation in Application Rate at Individual Locations: Not more than 25 percent.
- (6) Sloped Areas: Prevent drainage out of lower outlets. Program to avoid runoff.
- (7) Operating Pressure: As low as possible as is compatible with results.

6.4.11.7. 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 requirements.

(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 plastic pipe (Schedule 40) or polyethylene plastic pipe. Use overhead spray (gear or rotor) heads at lawn areas and drip or bubbler hoses or heads at tree, shrub, and groundcover beds.
- (d) Irrigation Capacity: Sufficient to maintain landscape plantings with maximum contribution by precipitation equal to the Precipitation Allowance.
- (e) Estimated Evapotranspiration: Equal to Potential Evapotranspiration times Average Plant Factor, in inches per year.
- (f) Potential Evapotranspiration: Inches per month for each month of year, for reference crop of 4-inch high well-watered grass, as determined by government or educational agricultural or irrigation information agency for actual project location.
- (g) Average Plant Factor: Average of plant factor of each different hydrozone based on relative areas of each, using plant factors as follows (or otherwise documented by research as relative to evapotranspiration of reference crop of 4-inch high well-watered grass).
  - (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; 0.3.
  - (3) Warm-Season Grasses: 0.6.
  - (4) Cool-Season Grasses: 0.8.
  - (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 Other Plants: 1.0.
- (h) Irrigation Efficiency: As calculated or designed for actual system provided.

6.4.11.8. Topsoil: Provide topsoil, whether native from the site or imported, for landscaped areas meeting the following criteria.

- (a) Conform to the USDA textural class with a pH of 6.5 to 7.0 for lawn/turf areas.
- (b) Conform to the USDA textural class with a pH of 7.5 to 8.5 for planting areas.
- (c) Maximum particle size is 3/4 inch.
- (d) Matter content between 5 to 20 percent by volume or 2 to 7 percent by weight.

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. Ensure 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 beds.

6.4.11.9. Mulch: Mulching practices for all planting material, such as trees, shrubs, and planting beds, will be in accordance with industry standard for commercial landscape areas. Mulch will be free of weeds to promote germination and seedling establishment. Hydromulch will be applied using the recommended rate of an organic tackifier. Erosion control blankets will be used whenever reclaiming slopes greater than 3:1 or along drainage areas where erosion is probable. Use nonwoven polypropylene or polyester fabric under bark.

#### 6.4.12. Turf:

6.4.12.1. **New Sod:** All sod will be locally grown and State-certified as classified by applicable state laws and industry standard. Provide amendments 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 2 inches 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) 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.

6.4.12.2. **Seed Mixes:** Performed by the seed supplier prior to delivery to the site. Bulk quantities of seed shall be labeled.

- (f) Provide seed that does not contain mold or is otherwise damaged.
- (g) Provide seed that does not contain amounts of weed seed greater than 1 percent by weight of the total mixture, and will be free of restricted or prohibited noxious weed seed.
- (h) Provide seed free of crop seed. Inert matter shall not exceed 3 percent by weight of the total mixture.

#### 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 JBLM Real Property Master Plan, except where existing buildings do not comply with the JBLM Area Design Guide.. 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:

**GENERAL:** Provide facilities that are fundamentally sustainable, require minimum operation and maintenance inputs, reflect the military hierarchy of their occupants and blend harmoniously with the existing adjacent style and context of development in the North Fort area, except where existing adjacent buildings do not comply with the Fort Lewis Area Development Guide (ADG). Facilities shall conform to the Fort Lewis Real Property Master Plan (RPMP) and North Fort ADG. Architectural requirements of the North Fort ADG are included in this section and the Building Photos Appendix.

**ARCHITECTURAL STYLE:** All North Fort Lewis area facilities shall be based on a "Neo-Georgian" or "Neo-Federal" style referenced from the historic garrison facilities located on main post. Stylistic features include using the "golden section" to set building proportioning and massing, balanced fenestration, central covered vestibule entrances with classical porticos, side gabled roofs with parapet end walls or hipped roofs, dormers or skylights for providing daylight to interior spaces of the facility, prominent chimneys, circular accent details or windows and exposed gutters with fascias. Lay out fenestration & building elements in a syncopated rhythm as illustrated in the building photos appendix. 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. Wall surfaces shall be brick masonry in appearance (to 2nd story floor level minimum for multi-story facilities and full wall height for single story facilities) with stucco appearance surfaces above. Complementary base and accent materials shall be stone, concrete or masonry in appearance. Slope roofs in the range of 4 on 12 to 6 on 12 (5 on 12 preferred) and use concrete tile (preferred) or standing seam metal. The color scheme is primarily neutral earth tones as shown in the Appendix F.

**COMPATIBILITY:** Proposed facilities shall include architectural elements required by the area design guide, conform with existing facility styles, and use the same color palettes as adjacent facilities within the same "superblock". Installation intent is to create several "superblocks" on North Fort that maintain a consistent campus aesthetic within each block. Photographic examples of buildings are provided in Appendix F to illustrate the architectural theme. All facilities shall incorporate a unifying style and aesthetic for their respective block. TEMF buildings shall be consistent with North Fort pre-engineered buildings and reference the adjacent COFs. Lawnmower Storage Buildings shall mimic the style and materials used on the facilities each LSB serves.

**CONTEXT:** See Appendix for photos of existing facilities on North Fort Lewis and illustrations that define required elements of the area development 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) Install fall protection anchor points on all roofs with a slope greater than 2:12
- (b) Minimum roof slope for low slope roof systems is ¼ inch per foot and 4 inches per foot for steep slope roof systems. Low-slope roof systems may only be used where required in other sections of the RFP. Slope all other roofs at 4:12 minimum (5:12 preferred). Designs that avoid complex valleys and flashing and venting conditions are preferred. Protect all exterior personnel doors from the weather. Minimum thickness of roofing materials shall be in accordance with standards listed in Applicable Criteria.
- (c) Exterior Wall Mockups: Construct a 6' wide x 6' 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), if used, shall include high-impact reinforcement at grade level walls and rain screen or drainable design. Exposed exterior materials shall not require periodic repainting. Preferred materials are factory prefinished, integrally colored, or have 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 masonry surfaces shall be provided with a penetrating, breathable masonry sealer.

(e) Exterior Doors: It is preferred that entry doors into lobbies and corridors be glazed aluminum storefront entry systems.

(f) Exterior Windows: Operable windows with insect screens are preferred for all occupied spaces. Power operators shall only be provided for windows that are not within the normal reach range of personnel. Windows in sleeping room shall be provided with manufacturer's standard hardware to allow window to be opened for venting while preventing access through the opening from the outside.

(g) Comply with provision applicable standards and with provision of Washington Administrative Code (WAC) 296-96 Elevator Safety Regulations, including inspections and certifications. Coordinate with Contracting Officer to ensure attendance by Elevator Inspector at necessary times 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.

(h) Exterior "No-Smoking" signs shall be installed at the minimum quantity totalling four (4); two (2) on the each bay side and one (1) on each end of the facility. Coordinate with the installation for final placement and quantity.

#### 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.

6.5.3.1. Key Changing: All locks 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, Public Works 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 Public Works 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 Public Works Lock Shop to combine 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) Beyond Security: POC: Julie Santie, 11420 Hwy 302 NW, Gig Harbor, WA 98329 (253) 720-7416
- (c) PD Services Unlimited: POC: Pam Johnson, 9508 356th St. S., McKenna, WA 98558 (360) 359-0811
- (d) Security Unlimited: POC: Mike Pennella, 8205 E. Martin Way #188, Olympia, WA 98516 (360) 351-1774 (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 core that are compatible with A-2 SFIC (A-2 system specifications are available at <http://www.lab-lockpins.com/pinsicore.htm>) and 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 Public Works 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 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 combining core. Do not place room number on keys.

6.5.3.6. Programmable Pushbutton Locksets: Hardware shall be programmable pushbutton locksets OSI Omnilock "OM500" for exterior doors and KABA "E-plex 5000" for all locking interior doors, except standard bored locksets shall be provided on mechanical, electrical, and telephone rooms. Programmable locks shall be provided with key override and interchangeable cores.

6.5.3.7. Mechanical, Electrical, and Communication Room Doors: Provide standard keyed locksets for these doors.

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

#### 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, and shall be a minimum of 20 by 15 inches, mounted 6 feet above grade, with red text on white background.
- (b) Gas Shutoff: Mount sign on the building above the natural gas meter and valve, and shall be a minimum of 20 by 15 inches, mounted 6 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.

#### 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,  $S_s=1.202$ . SRA for 1.0 second,  $S_1=0.380$ .

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.

6.7. 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).

#### 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: floor-mount type preferred.

## 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 post, except for requirements associated with single-point grounding. The "single-point grounding" portion of the distribution system applies to a single reference point to ground at the substations only. JBLM is, for all intent and purpose, a Delta, 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 for any questions regarding system requirements. Comply with the National Electrical Safety Code (NEC 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.

(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. 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 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. Encase duct banks under roads or paved areas subject to vehicular traffic in reinforced concrete. A 36-inch minimum burial depth is required to the top of the concrete encasement. Provide a 6-inch 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 two spare ducts in all medium-voltage duct banks and a pull cord in all empty ducts. Provide a minimum #2 bare copper ground conductor in the duct bank encasement and ground the conductor in all vaults.

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

(a) Splicing: Where splicing is required, provide junction assemblies in an appropriately sized vault with a hinged diamond-plate lid. Angle assemblies upward 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 padmount transformers and switches.

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

(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.

(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 to 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 to minimize pulling tension on the conductors. Provide vaults under all transformers with the transformer pad servicing as a portion of the lid for the vault.

(a) Conductor Installation: Secure conductors to insulators on racks on all four walls of vaults, 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.

(b) Vault Penetrations: Properly seal all transformer vault penetrations with waterproof grout to prevent water and moisture from entering the vault.

(c) Conduits: Start conduits entering the manhole at the lowest level of entry.

(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 to allow for hook-stick operation. 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, oil-filled, above-ground type. Fuse 200A taps. Install switches above ground on concrete pads.

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. For outdoor installation, use mineral oil design. Use high fire point fluids for indoor/vaults.

(a) Transformer Specifications: Distribution transformers shall be new, loop-feed, mineral oil-insulated, complying with ANSI C57.12.26. Transformers shall be dead-front, equipped with current-limiting bayonet oil-immersed fuses, five primary taps (two-above and two-below nominal), and a load-break switch (or switches) to facilitate 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. 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 pad-lock hasps and locks. Coordinate lock style and material with the Public Works Exterior Electrical Shop. Provide bollards for protection in locations vulnerable to vehicular traffic.

(b) Primary Connections: Primary conductor connections shall be compression type, except provide mechanical connectors at arrestor grounds.

(c) Distribution Cut-outs: 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 around each transformer and ground per National Electrical Safety Code (NESC) for a single-point grounded wye distribution system, with secondary neutral ground isolated from equipment ground and the ground strap removed. Below-grade ground connections shall be of the exothermic type. Refer to JBLM Public Works for typical detail.

(f) Transformer Pad: Transformer shall sit on a concrete pad sized to serve as the lid for the vault below the transformer. Pads for transformers rated 300 KVA and above shall provide access into the vault without removing the transformer. Access into the vault shall be through a double-hinged diamond plate lid. 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 °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. Encase duct banks under roads or paved areas subject to vehicular traffic in 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. 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: Telecommunications systems 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. All communications requirements shall be coordinated with the JBLM NEC through the Contracting Officer.

(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 Duct Bank and Manholes

(a) Coordinate new manhole/ductwork requirements to ensure manhole vault is correctly sized, duct is the correct schedule rating, and is pointed in the right direction.

(b) Contractor shall have a cabling/manhole coordination meeting with the COE, Contractor, and JBLM NEC Plans Branch prior to setting manholes and cable ductwork.

#### 6.9.3. Site Lighting

6.9.3.1. General: Provide exterior lighting appropriate for the building function. Provide street lighting (with photoelectric control) on metal poles for any new streets and on streets that are modified as part of this project. Street lighting shall match the type used on the existing streets within the project area.

(a) Provide exterior parking lot and pedestrian pathway lighting conforming to the applicable criteria Illuminating Engineering Society of North America (IESNA) recommended illumination levels and the Washington State Non-Residential Energy Code. Provide metal poles with pole-mounted, color-corrected, high-intensity discharge luminaires with cut-off feature to minimize light pollution. Site lighting circuits shall be direct-buried Schedule 40 PVC conduits encased in sand, except where subject to vehicular traffic, encase conduit in reinforced concrete. Provide handholes at each lighting pole. Provide site lighting circuits and controls from the adjacent primary facility service. Provide photoelectric control with manual bypass.

(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: Site grounding shall consist of a counterpoise grid system composed of 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.

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 post DDC system. 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. 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.

### 6.10.2. Telecommunications

6.10.2.1. General: Provide dedicated space on the telephone back board for Qwest and Comcast. Qwest and Comcast will provide and install their entrance cables and make connections to their equipment. 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. Comcast and Qwest will make the connections to their equipment.

6.10.2.2. Provide a standard NEC information outlet on the telephone backboard for connection to the Post EMCS. Coordinate the outlet location with the Department of Public Works.

6.10.2.3. 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: Design and install a complete, fully tested intrusion detection system, including installation of Government-Furnished Contractor-Installed (GFCI) equipment, all conduits and conductors, drawings, system integration, and all testing.

6.10.3.2. The Intrusion Detection System (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. Government-furnished equipment shall be provided to the contractor in factory-delivered unopened shipping boxes. Upon receipt of equipment, the contractor shall be responsible for all warranty issues associated with that equipment. Coordinate system requirements with the Physical Security office.

6.10.3.3. The Intrusion Detection System shall use Version 6.2.1.6 SAFENET operating system, with PB2000 processor, firmware revision 1.48, encrypted, and carried over the installation LAN via VLAN23. 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 operation and reporting of alarm events.

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 for access to the central monitoring station.

6.10.3.5. To reduce system compatibility problems, the Intrusion Detection System 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 Directorate of Emergency Services.

6.10.3.6. Final Testing and Acceptance: Notify the Contracting Officer, two weeks in advance, to schedule final joint Government/Contractor Performance Verification Test (PVT). Submit contractor performance test results, substantiating that the system meets contract requirements, prior to scheduling 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.

6.11.2. It is desirable to locate all primary mechanical equipment such as air-handlers, boilers, hot water heaters, pumps, storage tanks, etc., inside of a main mechanical room where possible. It is preferred that mechanical equipment not be installed on the roof and be easily accessible and replaceable without the use of a crane or lift. All equipment shall be of the high-efficiency type.

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 International Building Code and Washington Administrative Code (WAC) Chapter 296-96 for Washington State.

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 air capability. Communication rooms, SIPR rooms, and Electrical rooms may require cooling. Perform heat load calculations to include all anticipated heat producing equipment located within these spaces. Provide a 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". Use mechanical cooling only if heat load calculations indicate that ventilation (outdoor air) alone cannot maintain recommended room temperature. If mechanical cooling is required, provide self-contained or split system air-conditioning units using R-410A refrigerant. Unit should be capable of operating in economizer mode to ventilate the space with outdoor air until the

thermostat calls for mechanical cooling. Provide exhaust systems for all toilet rooms, shower rooms, janitor rooms, kitchens, clothes dryers, and electrical and mechanical rooms.

6.11.4.4. 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

6.11.4.5. Exhaust toilet rooms per ASHRAE 62.1 – 2004

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 utilities monitoring and control system (UMCS) requirements 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. Provide a building DDC system compatible with and remotely programmable and configurable through a Java Application Control Engine (JACE) Network Area Controller (NAC) and the Public Works Tridium AX system via the existing postwide IT wide area network (WAN) operated by NEC. The JACE Network Area Controllers have been approved by NEC for connection to the WAN/LAN. NEC does not allow routers on their WAN/LAN system. Provide a building control system which integrates with the Tridium system, controls the indoor environment, and manages energy consumption, and schedules preventative maintenance, controls interior lighting, controls exterior lighting, monitors fuel consumption, monitors water usage and hot water temperatures at tank and at hot water heater, discharge outlet and after the mixing valve, monitors electrical consumption, (monitors packaged equipment controls, and monitors equipment alarms). All motors are to be monitored for actual status using current transmitters. Provide a LonWorks or BACnet interface for packaged equipment controllers, when necessary for network communication.

6.11.5.1. Provide a central location (usually the mechanical room) for each building's control system to monitor and control each zone setpoint. Also provide one DDC system workstation for each project in at least one of the project buildings. Provide a system with alarms that identifies when system is outside of normal operation from sequence or setpoints. Provide interlock and safety routines that will safeguard and prevent progressive damage to equipment due to monitored failures. Provide a system which is user programmable, has access from remote locations, has multiple layers of secured access to data and program information, and has a graphical user interface accessible through any standard web browser without manufacturer's software. The graphical user interface shall allow for hierarchical graphical navigation between systems, provide graphical representations of systems, provide access to real-time data for systems, and provide the ability to override points in a system, and provide access to all supervisory monitoring and control functions. Each system display shall clearly distinguish 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. JBLM Standard graphical pages shall be used for system graphic displays, including overrides, alarm handling, scheduling, trends for critical values needing long-term or permanent monitoring via trends, and demand limiting.

6.11.5.2. Where exposed to damage, install wiring external to control panels, 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. Install instrumentation grounding as necessary to prevent ground loops, noise, and surges from adversely affecting operation of the system.

6.11.5.3. 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. 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.

6.11.5.4. If natural gas is used, connect gas meter to BAS/DDC/UMCS system for monitoring of gas usage. Connect electric and water meters measuring consumption to the DDC/BAS/UMCS system.

6.11.5.5. Provide one workstation desktop computer, monitor, etc. with performance meeting current technology standards and web supervisor workstation software, licensed to JBLM/GSA in the "Owner" section for the project. Provide 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. 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.

6.11.5.7. All computers shall have the NEC image installed through DPW IT Department before its DDC software is installed and licensed.

6.11.5.8. Room temperature sensors shall have pushbutton occupancy override with duration adjustable in programming. Temperature sensors shall be user adjustable with setpoint and adjustment span limited through programming and 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 to be adjustable through DDC GUI. Thermostats shall not be line voltage.

6.11.5.9. Provide M&C software with Web Supervisor license for additional JACEs.

(a) Provide M&C software with a license for no less than quantity of points to support systems being controlled and monitored, plus 10 percent more for expansion.

(b) The software shall be expandable in both number of points and number of clients supported in order to support system expansion.

6.11.5.10. Perform a Performance Verification Test (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.

6.11.5.11. Provide a minimum of 16 hours of training that consists 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, 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.

## 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:

No Additional Requirements.

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

6.13.2.1. Signage

6.13.2.2. Where fire alarm panels are located mechanical/equipment rooms signage shall read "FIRE ALARM" 14" X 3" 2 inch letters with white background and red letters.

6.13.2.3. Signage for sprinkler riser "RISER ROOM". Use 14" X 3" 2 inch letters with white background and red letters.

6.13.2.4. Signage for fire pump. "FIRE PUMP TEST VALVES". 20" X 15"

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 Government. Validation of credits will be accomplished by the Government. LEED certification of the project by the Contractor is not required. The Government may choose to seek LEED certification of the project, in which case the Government will pay certification fees and coordinate with the GBCI and the Contractor will furnish audit data as requested at no additional cost.

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 meet the criteria for this credit.

**EA Credit 6 Green Power.**

35% of the project's electricity WILL 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.

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. Emergency Unexploded Ordnance (UXO) Response: Should UXO be encountered during construction activities that are deemed to be a threat to human health or the environment, immediately contact JBLM EOD professionals to conduct an emergency response. Additionally, immediately contact the Contracting Officer if UXO is encountered. Include an evaluation of this scenario and procedures, with contact numbers, in the Health and Safety Plan (HASP) for the fieldwork, per the Washington State Department of Labor and Industries requirements.

6.15.2. 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 Contracting Officer if a monitoring well is encountered.

6.15.3. Other environmental issues (i.e., random underground storage tanks, transite piping, random transformer, etc.) may be encountered during construction activities. Contact the Contracting Officer if an environmental issue is encountered.

## 6.16. PERMITS

6.16.1. The Government has obtained no permits/licenses to this project. The Contractor shall obtain ALL permits/licenses required for this project. Submit permits to the Contracting Officer and Public Works Environmental Division (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. Upon notice to proceed, immediately begin working required permits, and supporting information required by the Government to process permits. Obtain a dig permit from JBLM DPW. Obtain approval for demolition and disposal plans from DPW. 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. Coordinate with DPW for commissioning and approval of water and sewer systems. A Stormwater Pollution Prevention Plan (SWPPP) is required for construction activities that will have a land disturbance of one or more acres (or is part of a common plan of development that will disturb an acre or greater), and has the potential for stormwater discharge to a water of the U.S. The Government must approve the SWPPP prior to land disturbing activities. One SWPPP may be submitted jointly for the project or each operator may submit a separate plan.

All permit applications must indicate the following address as the building and site owner:

JBLM Public Works  
ATTN: IMNW-PWE  
Box 339500 (Building 2012)  
Fort Lewis, WA 98433-9500

6.16.2. Additional Required Project Specific Permits:

6.16.2

Environmental Protection Agency: A construction General Permit shall be obtained through the Environmental Protection Agency (EPA). The SWPPP must be submitted to JBLM DPW Water Program prior to applying for general coverage. Follow the EPA's SWPPP template found at HYPERLINK

"<http://cfpub.epa.gov/npdes/stormwater/const.cfm>"<http://cfpub.epa.gov/npdes/stormwater/const.cfm>

Utility Outages: All utility outage request dates and times will be set by the appropriate government agency at Joint Base Lewis-McChord. Each individual outage request (according to the type of outage) will be set for either normal working hours or after hours/weekends. Outages shall be coordinated on a case by case basis through the contracting officer or appropriate government agency. Utility outages frequently affect more than one facility and require extensive coordination. The contractor shall perform all tests, have passed all inspections as required in the specifications and/or on the project drawings and coordinate between the contracting officer and/or their

representative(s) and government shops prior to requesting the utility outage. The contractor shall submit all requests for outages 14 days prior to the utility outage requested date for government approval.

**Traffic Diversion/Street Closings:** The contractor may make arrangements satisfactory to the appropriate government agency at Joint Base Lewis-McChord for the diversion of traffic. The contractor shall, at his own expense, provide all materials to erect traffic control devices and perform work necessary for the construction and maintenance of access roadways/drives for the diversion of traffic. The contractor shall notify the appropriate government agency and the fire department headquarters when any street is closed or obstructed. The contractor shall submit all requests for traffic diversion and/or street closings 14 days prior to the actual diversion/closing of street(s) for government approval.

**Exterior Utility Installation:** Where new utilities cross roads, driveways, and parking lots to be paved under this contract, install utilities prior to paving. If paving has occurred prior to installing the utilities, jacking or boring is required. It is preferred to jack and bore utilities under all existing paved roads unless otherwise directed by the appropriate government agency and/or Joint Base Lewis-McChord representative(s). Otherwise, open cut excavation is allowed if the pavement cut width is a minimum of 15-feet wide across the entire width of the road. Install new utilities that connect to existing utilities located under existing paved areas by open cut excavation. A minimum 15-foot pavement cut width is required for all open cut excavations.

The contractor shall coordinate with the appropriate government agency and/or Joint Base Lewis-McChord representative(s) at the installation regarding any anticipated street closings prior to utility connection work that cannot be accomplished through the jack and bore method.

## 6.17. DEMOLITION

**6.17.1. DISPOSAL OF MATERIALS:** Cut material generated from the project may be disposed of on post in designated disposal areas. Dispose of all other materials not designated for on post disposal off post at the contractor's expense. On post disposal areas for the specified materials are as follows.

- (a) Sequalitchew Creek Eco Park and 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 soils are accepted at the following pits subject to availability and direction of JBLM, Sequalitchew, Gray Army Airfield Pit, East Gate Pit, and Lincoln Pitc. Non-hazardous lead-contaminated soil (top 6 inches from designated areas) is accepted at former Landfill 2 subject to availability and direction from Public Works.
- (c) Submit a "Borrow Source Use and Entry Notification Form" to dispose of uncontaminated soils within Fort Lewis at the designated sites and under the direction of PW.
- (d) Coordinate all recycling activities, disposal of materials on JBLM, and obtaining permit forms through Public Works, Ron Norton, Solid Waste and Recycling Program Manager JBLM PW/ENRD, General Dynamics; Phone: (253) 966-6452; Cell: (253) 377-1420; Fax: (253) 967-9937; E-mail: [ron.norton1@us.army.mil](mailto:ron.norton1@us.army.mil).

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

## 6.18. ADDITIONAL FACILITIES

No Additional Facilities.

End of Section 01 10 00.0002

**SECTION 01 33 00.0002  
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 five (5) copies of the submittal and return zero(0) copy(ies) of the submittal.

**1.14. INFORMATION ONLY SUBMITTALS**

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

End of Section 01 33 00.0002

**SECTION 01 33 16  
DESIGN AFTER AWARD**

**1.0 GENERAL INFORMATION**

1.1. INTRODUCTION

1.2. DESIGNER OF RECORD

**2.0 PRODUCTS (Not Applicable)**

**3.0 EXECUTION**

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3.1.1. Design Quality Control Plan

3.1.2. Post Award Conference

3.1.3. Partnering & Project Progress Processes

3.1.4. Initial Design Conference

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3.2.2. Interim Design Submittals

3.2.3. Over-the-Shoulder Progress Reviews

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3.4. INTERIM DESIGN REVIEWS AND CONFERENCES

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3.5. INTERIM DESIGN REQUIREMENTS

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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 FURNITURE, FIXTURES AND EQUIPMENT REQUIREMENTS**

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

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

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

### **1.2. DESIGNER OF RECORD**

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

## **2.0 PRODUCTS (Not Applicable)**

## **3.0 EXECUTION**

### **3.1. PRE-WORK ACTIVITIES & CONFERENCES**

#### **3.1.1. Design Quality Control Plan**

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

#### **3.1.2. Post Award Conference**

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

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

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

### 3.1.3. Partnering & Project Progress Processes

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

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

### 3.1.4. Initial Design Conference

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

### 3.1.5. Pre-Construction Conference

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

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

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

### 3.2.1. Site/Utilities

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

### 3.2.2. Interim Design Submittals

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

### 3.2.3. Over-the-Shoulder Progress Reviews

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

review procedures shall form the contractual basis for the official schedule, in the event that the partnering process determines that the formal intermediate review process to be best suited for efficient project execution. However, the Government pledges to support and promote the partnering process to work with the Contractor to find ways to better the design schedule.

#### 3.2.4. Final Design Submissions

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

#### 3.2.5. Design Complete Submittals

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

#### 3.2.6. Holiday Periods for Government Review or Actions

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

#### 3.2.7. Late Submittals and Reviews

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

### 3.3. DESIGN CONFIGURATION MANAGEMENT

#### 3.3.1. Procedures

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

#### 3.3.2. Tracking Design Review Comments

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

#### 3.3.3. Design and Code Checklists

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

### 3.4. INTERIM DESIGN REVIEWS AND CONFERENCES

#### 3.4.1. General

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

#### 3.4.2. Procedures

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

#### 3.4.3. Conference Documentation

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

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

### 3.5. INTERIM DESIGN REQUIREMENTS

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

#### 3.5.1. Drawings

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

### 3.5.2. Design Analyses

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

- (b) Provide all references used in the design including Government design documents and industry standards used to generate the fire protection analysis.
- (c) Provide classification of each building in accordance with fire zone, building floor areas and height and number of stories.
- (d) Provide discussion and description of required fire protection requirements including extinguishing equipment, detection equipment, alarm equipment and water supply. Alarm and detection equipment shall interface to requirements of Electronic Systems.
- (e) Provide hydraulic calculations based on water flow test for each sprinkler system to insure that flow and pressure requirements can be met with current water supply. Include copies of Contractor's water flow testing done to certify the available water source.

#### 3.5.2.8. For parts including plumbing systems:

- (a) List all references used in the design.
- (b) Provide justification and brief description of the types of plumbing fixtures, piping materials and equipment proposed for use.
- (c) Detail calculations for systems such as sizing of domestic hot water heater and piping; natural gas piping; LP gas piping and tanks, fuel oil piping and tanks, etc., as applicable.
- (d) When the geotechnical report indicates expansive soils are present, indicate in the first piping design submittal how piping systems will be protected against damage or backfall/backflow due to soil heave (from penetration of slab to the 5 foot building line).

#### 3.5.2.9. For elevator systems:

- (a) List all criteria codes, documents and design conditions used.
- (b) List any required permits and registrations for construction of items of special mechanical systems and equipment.

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

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

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

#### 3.5.3. Geotechnical Investigations and Reports:

3.5.3.1. The contractor's licensed geotechnical engineer shall prepare a final geotechnical evaluation report, to be submitted along with the first foundation design submittal. Make this information available as early as possible during the over-the-shoulder progress review process. Summarize the subsurface conditions and provide recommendations for the design of appropriate utilities, foundations, floor slabs, retaining walls, embankments, and pavements. Include compaction requirements for fill and backfill under buildings, sidewalks, other structures and open areas. Recommend foundation systems to be used, allowable bearing pressures for footings, lateral load resistance capacities for foundation systems, elevations for footings, grade beams, slabs, etc. Provide an assessment of post-construction settlement potential including total and differential. Provide recommendations regarding lateral earth pressures (active, at-rest, passive) to be used in the design of retaining walls. Include the recommended spectral accelerations and Site Class for seismic design along with an evaluation of any seismic hazards and recommendations for mitigation, if required. Include calculations to support the recommendations for bearing capacity, settlement, and pavement sections. Include supporting documentation for all recommended

design parameters such as Site Class, shear strength, earth pressure coefficients, friction factors, subgrade modulus, California Bearing Ratio (CBR), etc. Provide earthwork recommendations, expected frost penetration, expected groundwater levels, recommendations for dewatering and groundwater control and the possible presence of any surface or subsurface features that may affect the construction of the project such as sinkholes, boulders, shallow rock, old fill, old structures, soft areas, or unusual soil conditions. Include pH tests, salinity tests, resistivity measurements, etc., required to design corrosion control and grounding systems. Include the raw field data. Arrange a meeting with the Government subsequent to completion and evaluation of the site specific geotechnical exploration to outline any differences encountered that are inconsistent with the Government provided preliminary soils information. Clearly outline differences which require changes in the foundation type, or pavement and earthwork requirements from that possible and contemplated using the Government furnished preliminary soils investigation, which result in a change to the design or construction. Any equitable adjustment is subject to the provisions of the contract's Differing Site Conditions Clause.

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

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

#### 3.5.4. LEED Documentation:

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

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

#### 3.5.5. Energy Conservation:

3.5.5.1. Refer to Section 01 10 00, Paragraph 5. Interim and Final Design submittals shall demonstrate that each building including the building envelope, HVAC systems, service water heating, power, and lighting systems meet the Mandatory Provisions and the Prescriptive Path requirements of ASHRAE 90.1. Use Compliance Documentation forms available from ASHRAE and included in the ASHRAE 90.1 User's Manual for this purpose. The Architectural Section of the Design Analysis shall include completed forms titled "Building Envelope

Compliance Documentation Parts I and II". The Heating Ventilating and Air Conditioning (HVAC) Section of the Design Analysis shall include a completed form titled "HVAC Simplified Approach Option - Part I" if this approach is allowed by the Standard. Otherwise, the HVAC Section of the Design Analysis shall include completed forms titled "HVAC Mandatory Provisions - Part II" and "HVAC Prescriptive Requirements - Part III". The Plumbing Section of the Design Analysis shall include a completed form titled "Service Water Heating Compliance Documentation". The Electrical Section of the Design Analysis shall include an explanatory statement on how the requirements of ASHRAE 90.1-2004 Chapter 8 Power were met. The Electrical Section of the Design Analysis shall also include a completed form titled "Lighting Compliance Documentation".

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

### 3.5.6. Specifications

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

### 3.5.7. Building Rendering

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

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

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

### 3.5.8. Interim Building Design Contents

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

information for an individual design package as is developed at the Interim design level for review purposes. These pieces shall be developed as the design progresses toward the design complete stage.

#### 3.5.8.1. Lawn and Landscaping Irrigation System

#### 3.5.8.2. Landscape, Planting and Turfing

#### 3.5.8.3. Architectural

- (a) Design Narrative
- (b) Architectural Floor Plans, Typical Wall and Roof Sections, Elevations
- (c) Finish schedule
- (d) All required equipment
- (e) Special graphics requirements
- (f) Door and Window Schedules
- (g) Hardware sets using BHMA designations
- (h) Composite floor plan showing all pre-wired workstations
- (i) Structural Interior Design (SID) package: See ATTACHMENT A for specific requirements
- (j) Furniture, Fixtures & Equipment (FF&E) design package: See ATTACHMENT B for specific requirements

#### 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. Information Systems including the following responsibilities:

- (a) Telecommunications Cabling
- (b) Supporting Infrastructure
- (a) Outside Plant (OSP) Cabling - Campus or Site Plans - Exterior Pathways and Inter-Building Backbones
  - (a) 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.
  - (b) Layout of complete building per floor - Serving Zone Boundaries, Backbone Systems, and Horizontal Pathways including Serving Zones Drawings - Drop Locations and Cable ID's
  - (c) 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.

#### 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 CADD Standard, available at <https://caddim.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. Drawing files with external references or special fonts are not acceptable. 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) <b>Full-Size</b> Full Sets/ *Partial Sets	Design Analyses & Specs Full Sets/ *Partial Sets	Drawing Size (Half Size) <b>Half-Size</b> Full Sets/ *Partial Sets	Non-BIM Data CD-ROM or DVD as Necessary (PDF& <b>.dgn</b> )	Furniture Submittal (FFE)	Structural Interior Design Submittal	BIM Data DVD (Per Attach F)
Commander, U.S.Army Engineer District <b>U.S Army Corps of Engineers, Seattle District</b>	0/0	2/0	2/0	2	2	2	3
Commander, U.S.Army Engineer District, Center of Standardization <b>Savannah District</b>	0/0	2/0	2/0	2	2	2	2
Installation	0/0	2/0	2/0	22	0	0	0
U.S.Army Corps of Engineers Construction Area Office	4/0	7/0	13/0	34	6	6	3
Information Systems Engineering Command (ISEC)	0/0	0/1	0/0	1	1 (Electronic only)	N/A	1
Other Offices	0/0	0/0	0/0	0	0	0	0

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

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

### 3.9.2. Web based Design Submittals

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 twenty five (25) 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 STRUCTURAL 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 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. FORMAT AND SCHEDULE**

Prepare and submit for approval a comprehensive FF&E scheme for an interim design submittal. The Contractor's interior designer, not a furniture dealer, shall develop the design. FF&E is the selection, layout, specification and documentation of furniture includes but is not limited to workstations, seating, tables, storage and shelving, filing, trash receptacles, clocks, framed artwork, artificial plants, and other accessories. Contract documentation is required to facilitate pricing, procurement and installation. The FF&E package is based on the furniture footprint developed in the Structural Interior Design (SID) portion of the interior design. Develop the FF&E package concurrently with the building design to ensure that there is coordination between the electrical outlets, switches, J-boxes, communication outlets and connections, and lighting as appropriate. In addition, coordinate layout with other building features such as architectural elements, thermostats, location of TV's, GF/GI equipment (for example computers, printers, copiers, shredders, faxes), etc. Locate furniture in front of windows only if the top of the item falls below the window and unless otherwise noted, do not attach furniture including furniture systems to the building. If project has SIPRNET and/or NIPRNET, coordinate furniture layout with SIPRNET and NIPRNET separation requirements. Verify that access required by DOIM for SIPRNET box and conduit is provided. The DOR shall interview appropriate Government personnel to determine FF&E requirements for furniture and furnishings prior to preparation of the scheme to be presented. Determine FFE items and quantities by, but not limited to: (1) the number of personnel to occupy the building, (2) job functions and related furniture/office equipment to support the job function, (3) room functions, (4) rank and grade. Present original sets of the scheme to reviewers at an interim design conference upon completion of the interim architectural submittal or three months prior to the submittal of the final FF&E package (whichever comes first).

Design may proceed to final with the FF&E scheme presented at the conclusion of the interim phase, after resolutions to the comments have been agreed upon between DOR and Government reviewers.

Provide six copies of the electronic versions of all documents upon completion of the final architectural submittal or ten months prior to the contract completion date (whichever comes first), to ensure adequate time for furniture acquisition. Provide unbound, electronic drawings in CAD and BIM. Provide all files needed to view complete drawings. Submit all text documents in Microsoft Word or Excel..

Submit three copies of the final and complete FF&E information and samples in 8 ½" x 11" format using three ring binders with pockets on the inside of the cover upon completion of the final architectural submittal or ten months prior to the contract completion date (whichever comes first). Use more than one binder when there are numerous pages with thick samples. Large D-ring binders are preferred to O-ring binders. Use page protectors that are strong enough to keep pages from tearing out for upholstery and finish boards. 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 "Furniture, Fixtures & Equipment" package and include the project title and location, project number, Contractor/A/E name and phone number(s), submittal stage and date.

Provide electronic copies of all documents upon completion of the final architectural submittal or ten months prior to the contract completion date (whichever comes first), to ensure adequate time for furniture acquisition. Provide six compact disks with all drawings files needed to view the complete drawings unbound and in the latest version AutoCAD. Provide six additional compact disks of all text documents in Microsoft Word or Excel.

Design submittal requirements include, but are not limited to:

**1.1.1. Narrative of Interior Design Objectives**

Provide a narrative description of the furniture, to include functional, safety and ergonomic considerations, durability, sustainability, aesthetics, and compatibility with the building design.

**1.1.2. Furniture Order Form**

Prepare one Furnishings Order Form for each item specified in the design. This form identifies all information required to order each individual item. In addition to the project name and location, project number, and submittal phase, the order form must include:

- (a) Furniture item illustration and code
- (b) Furniture item name
- (c) Job name, location, and date
- (d) General Services Administration (GSA) FSC Group, part, and section
- (e) Manufacturer, Product name and Product model number or National Stock Number (NSN)
- (f) Finish name and number (code to finish samples)
- (g) Fabric name and number, minimum Wyzenbeek Abrasion Test double rubs (code to fabric samples)
- (h) Dimensions
- (i) Item location by room number and room name
- (j) Quantity per room
- (k) Total quantity
- (l) Special instructions for procurement ordering and/or installation (if applicable)
- (m) Written Product Description: include a non-proprietary paragraph listing the salient features of the item to include but not limited to:
  - (1) required features and characteristics
  - (2) ergonomic requirements
  - (3) functional requirements
  - (4) testing requirements
  - (5) furniture style
  - (6) construction materials
  - (7) minimum warranty

The following is an example for "m" features and characteristics, ergonomic requirements and functional requirements:

Chair Description:

- (1) Mid-Back Ergonomic Task Chair
- (2) Pneumatic Gaslift; Five Star Base
- (3) Mesh Back; Upholstered Seat
- (4) Height and Width Adjustable Task Arms:
  - a. Arm Height: 6"- 11" (+-1/2")
  - b. Arm Width: 2"- 4" adjustment
- (5) Height Adjustable Lumbar Support
- (6) Adjustable Seat Height 16"-21" (+- 1")
- (7) Sliding Seat Depth Adjustment 15"-18" (+-1")
- (8) Standard Hard Casters (for carpeted areas)
- (9) Overall Measurements:
  - a. Overall width: 25" - 27"
  - b. Overall depth: 25"- 28"

- (10) Must have a minimum of the following adjustments (In addition to the above):
- a. 360 Degree Swivel
  - b. Knee-Tilt with Tilt Tension
  - c. Back angle
  - d. Forward Tilt
  - e. Forward Tilt and Upright Tilt Lock

For projects with systems furniture, also provide a written description of the following minimum requirements:

- (1) Type furniture systems (panel, stacking panels, spine wall, desk based system, or a combination)
- (2) Minimum noise reduction coefficient (NRC)
- (3) Minimum sound transfer coefficient (STC)
- (4) Minimum flame spread and smoke development
- (5) UL testing for task lighting and electrical system
- (6) Panel widths and heights and their locations (this may be done on the drawings) Worksurface types and sizes (this may be done on the drawings)
- (7) Worksurface edge type
- (8) Varying panel/cover finish materials and locations (locations may be shown on the drawings)
- (9) Storage requirements
- (10) Keyboard requirements
- (11) Lock and keying requirements
- (12) Accessory components (examples: tack boards, marker boards, paper management)
- (13) Electrical and communication raceway requirement; type, capacity and location (base, bellline, below and/or above bellline)
- (14) Locations of communication cables (base, bellline, below and/or above bellline, top channel)
- (15) Types of electrical outlets
- (16) Types of communication jacks; provided and installed by others
- (17) Locations of electrical outlets and communication jacks (this may be done on the drawings)
- (18) Type of cable (examples: Cat. 5, Cat. 6, fiber optic; UTP or STP, etc.) system needs to support; provided and installed by others

### 1.1.3. Alternate Manufacturer List

Provide a table consisting of major furniture items that lists the manufacturers products specified on the Order Form and two alternate manufacturers. Major furniture items include, but are not limited to, casegoods, furniture systems, seating, and tables. Organize matrix by item code and item name. Supply alternates that are available on GSA Schedule and meet the requirements of the Furniture Order Form. One of the two alternates must be from UNICOR if possible. Provide manufacturer name address, telephone number, product series and product name for each alternate manufacturer.

### 1.1.4. FF&E Procurement List

Provide a table that lists all FF&E furniture, mission unique equipment and building Contractor Furnished/Contractor Installed (CF/CI) items. Give each item a code and name and designate whether item will be procured as part of the FF&E furniture, mission unique equipment or the building construction contract. Use the item code to key all FF&E documents including location plans, color boards, data sheets, cost estimate, etc.

### 1.1.5. Points of Contact (POCs)

Provide a comprehensive list of POCs needed to implement the FF&E package. This would include but not be limited to appropriate project team members, using activity contacts, interior design representatives, construction contractors and installers involved in the project. In addition to name, address, phone, fax and email, include each contact's job function. Divide the FF&E package into different sections based on this listing, applies to order forms and cost estimates.

#### 1.1.6. Color Boards

Provide color boards for all finishes and fabrics for all FF&E items. Finishes to be included but not limited to paint, laminate, wood finish, fabric, etc.

#### 1.1.7. Itemized Furniture Cost Estimate

Provide an itemized cost estimate of furnishings keyed to the plans and specifications of products included in the package. This cost estimate should be based on GSA price schedules. The cost estimate must include separate line items for general contingency, installation, electrical hook-up for systems furniture or other furniture requiring hardwiring by a licensed electrician, freight charges and any other related costs. Installation and freight quotes from vendors should be use in lieu of a percentage allowance when available. Include a written statement that the pricing is based on GSA schedules. An estimate developed by a furniture dealership may be provided as support information for the estimate, but must be separate from the contractor provided estimate.

### 1.2. INTERIOR DESIGN DOCUMENTS

#### 1.2.1. Overall Furniture and Area Plans

Provide floor Plans showing locations and quantities of all freestanding, and workstation furniture proposed for each floor of the building. Key each room to a large scale Furniture Placement Plan showing the furniture configuration, of all furniture. Provide enlarged area plans with a key plan identifying the area in which the building is located. Key all the items on the drawings by furniture item code. Do not provide manufacturer specific information such as product names and numbers on drawings, Drawings shall be non-proprietary. This is typical for FFE on all plans, including those mentioned below.

#### 1.2.2. Workstation Plans

Show each typical workstation configuration in plan view, elevations or isometric view. Drawings shall illustrate panels and all major components for each typical workstation configuration. Identify workstations using the same numbering system as shown on the project drawings. Key components to a legend on each sheet which identifies and describes the components along with dimensions. Provide the plan, elevations and isometric of each typical workstation together on the same drawing sheet.

#### 1.2.3. Panel Plans

Show panel locations and critical dimensions from finished face of walls, columns, panels including clearances and aisle widths. Key panel assemblies to a legend which shall include width, height, configuration of frames, panel fabric and finishes (if there are different selections existing within a project), powered or non-powered panel and wall mount locations.

#### 1.2.4. Desk Plans

Provide typical free standing desk configurations in plan view, elevation or isometric view and identify components to clearly represent each desk configuration.

#### 1.2.5. Reflected Ceiling Plans

Provide typical plans showing ceiling finishes and heights, lighting fixtures, heating ventilation and air conditioning supply and return, and sprinkler head placement for coordination of furniture.

#### 1.2.6. Electrical and Telecommunication Plans

Show power provisions including type and locations of feeder components, activated outlets and other electrical components. Show locations and quantities of outlets for workstations. Clearly identify different outlets, i.e. electrical, LAN and telecommunication receptacles indicating each type proposed. Show wiring configuration, (circuiting, switching, internal and external connections) and provide as applicable.

#### 1.2.7. Artwork Placement Plans

Provide an Artwork Placement Plan to show location of artwork, assign an artwork item code to each piece of artwork. As an alternative, artwork can be located on the Furniture Plans. Provide a schedule that identifies each piece by room name and number. Provide installation instructions; include mounting height.

#### 1.2.8. Window Drapery Plans

Provide Interior Window Drapery Plans. Key each drapery treatment to a schedule showing color, pattern, material, drapery size and type, draw direction, location and quantities.

### 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 for 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 provide desks, storage and tables with leveling devices to compensate for uneven floors.

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

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

1.4.4. Unless otherwise noted, specify lockable desks and workstations and storage of steel construction. Use tempered glass glazing when glazing is required.

### 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 manufacturer's fabric grades and are available through their GSA Schedule. Customers Own Material

(COM) can be used in headquarter buildings in command suites with executive furniture. Coordinate specific locations with Corps of Engineers Interior Designer.

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

## 1.6. ACCESSORIES

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

1.6.2. Not Used.

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

## 1.7. MISSION UNIQUE EQUIPMENT

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

## 1.8. SUSTAINABILITY

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

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

## 1.9. FURNITURE SYSTEMS

1.9.1. General.

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

1.9.2. Connector Systems.

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

1.9.3. Panels and Spine Walls

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

#### 1.9.4. Electrical And Information/Technology (IT)

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

#### 1.9.5. Pedestals

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

### 1.10. EXECUTIVE FURNITURE

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

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

### 1.11. SEATING

#### 1.11.1. General

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

#### 1.11.2. Desk and Guest Seating

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

#### 1.11.3. Conference Room Seating

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

#### 1.11.4. Lounge, Waiting and Reception Area Seating

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

#### 1.11.5. Break Room Seating

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

#### 1.11.6. Lounge, Waiting and Reception Furniture.

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

#### 1.12. FILING AND STORAGE.

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

#### 1.13. TRAINING TABLES.

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

#### 1.14. FURNITURE WARRANTIES.

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

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

## **ATTACHMENT C TRACKING COMMENTS IN DRCHECKS**

### **1.0 General**

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

### **2.0 DrChecks Review Comments**

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

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

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

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

### **3.0 DrChecks Initial Account Set-Up**

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

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

### **4.0 DrChecks Reviewer Role**

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

4.1. Log into DrChecks.

4.2. Click on the appropriate project.

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

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

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

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

## **5.0 DrChecks Comment Evaluation**

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

5.1. Log into DrChecks.

5.2. Click on the appropriate project.

5.3. Under "Evaluate" click on the number under "Pending".

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

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

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

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

## **6.0 DrChecks Back-check**

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

6.1. Log into DrChecks.

6.2. Click on the appropriate project.

6.3. Under "My Backcheck" click on the number under "Pending".

6.4. If you agree with the designer's response select "Close Comment" and add a closing response if desired.

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

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

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

**ATTACHMENT D  
SAMPLE FIRE PROTECTION AND LIFE SAFETY CODE REVIEW**

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

**1.0 SAMPLE FIRE PROTECTION AND LIFE SAFETY CODE REVIEW**

- 1.1. Project Name (insert name and location)
- 1.2. Applicable Codes and Standards
  - 1.2.1. Unified Facilities Criteria (UFC): 3-600-01, Design: Fire Protection Engineering For Facilities
  - 1.2.2. International Building Code (IBC) for fire resistance requirements, allowable floor area, building height limitations and building separation distance requirements, except as modified by UFC 3-600-01.
  - 1.2.3. National Fire Protection Association (NFPA) 101 Life Safety Code (latest edition), for building egress and life safety and applicable criteria in UFC 3-600-01.
  - 1.2.4. ADA and ABA 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 Section 712, 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:

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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	REQUIRED DOCUMENTATION	Date Submitted (to be filled in by Contractor)	Government Reviewer's Use (OCT09REV)
PAR	FEATURE	DUE AT			DATE	REV
<b>GENERAL</b>						
GENERAL - All calculations shall be in accordance with LEED 2.2 Reference Guide.						
GENERAL - Obtain excel version of this spreadsheet at <a href="http://en.sas.usace.army.mil/enWeb/EngineeringCriteria">http://en.sas.usace.army.mil/enWeb/EngineeringCriteria</a> . 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)
<b>CATEGORY 1 - SUSTAINABLE SITES</b>						
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 building, 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	REQUIRED DOCUMENTATION	DATE	REV
				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
				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
				Option 2: Low-emission & fuel-efficient vehicle parking calculation.		CIV
				Option 2: List of drawings and specification references that show location and number of preferred parking spaces and signage.		CIV
				Option 3: Low-emission & fuel-efficient vehicle refueling station calculation.		CIV
				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
				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

LEED Credit Paragraph	Contractor Check Here if Credit is Claimed	LEED-NC v2.2 Submittals (OCT09REV)	Provide for Credit Audit Only	REQUIRED DOCUMENTATION	DATE	REV
				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
				Option 1: List of installed roof materials indicating, for each, manufacturer, product name and identification, SRI value and roof slope.		PE
			X	Option 1: Manufacturer published product data or certification confirming SRI		PE
				Option 2: Percentage calculation indicating percentage of vegetated roof area.		ARC
				Option 3: Combined reflective and green roof calculation.		ARC
				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		
				Option 3: List of installed roof materials indicating, for each, manufacturer, product name and identification, SRI value and roof slope.		PE
			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 interior fixtures 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 facade/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
<b>CATEGORY 2 – WATER EFFICIENCY</b>						
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

LEED Credit Paragraph	Contractor Check Here if Credit is Claimed	LEED-NC v2.2 Submittals (OCT09REV)	Provide for Credit Audit Only	REQUIRED DOCUMENTATION	Date Submitted (to be filled in by Contractor)	Government Reviewer's Use (OCT09REV)
PAR		FEATURE	DUE AT		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 conveyance 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
WE3.2		Water Use Reduction: 30% Reduction	Closeout	X Manufacturer published product data or certification confirming fixture water usage.		PE MEC
<b>CATEGORY 3 – ENERGY AND ATMOSPHERE</b>						
EAPR1		Fundamental Commissioning of the Building Energy Systems (PREREQUISITE)	**Final Design	**Owner's Project Requirements document		ALL MEC, ELEC
			**Final Design	**Basis of Design document for commissioned systems		MEC, ELEC
			**Final Design	**Commissioning Plan		

LEED Credit Paragraph	Contractor Check Here if Credit is Claimed	LEED-NC v2.2 Submittals (OCT09REV)	Provide for Credit Audit Only	REQUIRED DOCUMENTATION	DATE	REV
				Statement confirming all commissioning requirements have been incorporated into construction documents.		PE
				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
EA1		Optimize Energy Performance	Final Design	Option 2: Narrative describing phase out plan, including specific information on phase out dates and refrigerant quantities.		MEC
			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 listing, 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		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		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
<b>CATEGORY 4 – MATERIALS AND RESOURCES</b>						
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
			**Construction Quarterly and Closeout	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	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	Manufacturer published product data or certification confirming regional material percentages in spreadsheet		PE

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PAR		FEATURE	DUE AT		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 manufacturer published product data or certification confirming all certified wood materials percentages in spreadsheet.		PE
<b>CATEGORY 5 – INDOOR ENVIRONMENTAL QUALITY</b>						
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		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	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	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	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	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					
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		
<b>CATEGORY 6 – FACILITY DELIVERY PROCESS</b>								
IDc1.1		Innovation in Design	Final Design OCT09REV	Narrative describing 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 responsibilities in the project.		ARC		

**ATTACHMENT F**  
Version 02-03-2010

**BUILDING INFORMATION MODELING REQUIREMENTS**

**1.0 Section 1 - Submittal Format**

1.1. Design Deliverables. Develop all designs using Building Information Modeling (BIM) and Computer Aided Design (CAD) software. Design submittal drawings shall be Full-Size size, suitable for half-size scaled reproduction.

**2.0 Section 2 – Design Requirements**

2.1. BIM Model and Facility Data. Contractor shall use BIM application(s) and software(s) to develop project designs. "Facility Data" is defined as associated intelligent attribute data. The "Model" is defined as 3D graphics that includes Facility Data and output as described in the paragraph 'Output' below. Contractors will use the Model to produce accurate Construction Documents. For each Center of Standardization (CoS) facility type included in this project, all BIM Models and associated Facility Data shall be submitted in Bentley Systems BIM Workspace with associated USACE Bentley BIM Workspace (which includes specific standard BIM libraries and definitions). This Workspace can be downloaded from the CAD/BIM Technology Center. [Where available, the workspace will be specific to this CoS Facility Standard Design. The Contractor will be provided a baseline multi-discipline BIM Project Model for the CoS Facility Standard Design type, where such a model exists (for the purposes of site adaptation).] The USACE Bentley BIM Workspace is dependent on specific versions of the Bentley BIM suite of products and only the versions of the software that are listed in the Contractor instructions included with the USACE BIM Workspace are permitted to be used.

2.1.1. Reference. Refer to ERDC TR-06-10, "U.S. Army Corps of Engineers Building Information Modeling Road Map" from the CAD/BIM Technology Center website for more information on the USACE BIM implementation goals.

2.2. Drawings. Deliver CAD files used for the creation of the Construction Documents Drawings per requirements in Section 01 33 16, the criteria of the USACE U.S Army Corps of Engineers, Seattle District District, and as noted herein. Specification of a CAD file format for these Drawings does not limit which BIM application(s) or software(s) may be used for project development and execution.

2.2.1. IFC Support. The Contractor's selected BIM application(s) and software(s) must support the IFC (Industry Foundation Class - see [www.iai-tech.org](http://www.iai-tech.org)). Submit any deviations from or additions to the IFC property sets for any new spaces, systems, and equipment for Government approval.

2.2.2. Submittal Requirements. BIM submittals shall be fully interoperable, compatible, and editable with the Bentley BIM tools. Use the specified version of the USACE Bentley BIM Workspace and conform to the requirements of **Sections 3 and 4 below**.

2.2.3. BIM Project Execution Plan.

2.2.3.1. Develop a BIM Project Execution Plan ("Plan" or "PxP") documenting the BIM and analysis technologies selected for the Project Model (integrated with the AEC CAD Standard) from concept development through As-Builts as a design, production, coordination, construction, and documentation tool and the collaborative process by which it shall be executed. See Section 7 for additional guidance on developing the Plan.

2.2.4. BIM Requirements.

2.2.4.1. Facility Data. Develop the Facility Data consisting of a set of intelligent elements for the Model (e.g., doors, air handlers, electrical panels). This Facility Data shall include all material definitions and attributes that are necessary for the Project facility design and construction. Additional data in support of Section 6 Contractor Electives is encouraged.

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

2.2.4.3. Model Granularity. Models may vary in level of detail for individual elements within a model, but at a minimum must include all features that would be included on a quarter inch (1/4" = 1'0") scaled drawing (e.g. at least 1/16<sup>th</sup>, 1/8<sup>th</sup> and 1/4<sup>th</sup>), or appropriately scaled civil drawings.

2.2.4.4. Output. Submitted CAD drawings (e.g., plans, elevations, sections, schedules, details, etc.) shall be derived (commonly known as extractions, views or sheets) and maintained from the submitted Model and Facility Data.

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

2.3.1. Model Standards Checks. QC validation used to ensure that the Project Facility Data set has no undefined, incorrectly defined or duplicated elements. Report non-compliant elements and corrective action plan to correct non-compliant elements. Provide the government with detailed justification and request government approval for any non-compliant element which the contractor proposes to be allowed to remain in the Model.

2.3.2. CAD Standards Checks. QC checking performed to ensure that the fonts, dimensions, line styles, levels and other construction document formatting issues are followed per the A/E/C CADD Standard.

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

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

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

2.4.2. Interference Management Checks. Locate conflicting spatial data in the Model where two elements are occupying the same space. Log hard interferences (e.g., mechanical vs. structural or mechanical vs. mechanical overlaps in the same location) and soft interferences, (e.g., conflicts regarding equipment clearance, service access, fireproofing, insulation) in a written report and resolve.

2.4.3. IFC Coordination View. Provide an IFC Coordination View in IFC Express format for all deliverables. Provide exported property set data for all IFC supported named building elements.

2.4.4. Other Parameters. Develop such other Review parameters as the Contractor deems appropriate for the Project and provide to the Government for concurrence..

### **3.0 Section 3 – Design Stage Submittal Requirements**

3.1. General Submittal Requirements.

3.1.1. Provide submittals in compliance with BIM Project Execution Plan deliverables at stages as described hereinafter.

3.1.2. At each Stage in Paragraphs 3.3 through 3.6, provide a Contractor-certified written report confirming that consistency checks as identified in Paragraphs 2.3 and 2.4 have been completed. This report shall be discussed as part of the review process and shall address cross-discipline interferences, if any.

3.1.3. At each Stage in Paragraphs 3.3 through 3.6, provide the Government with:

- The Model, Facility Data, Workspace and CAD Data files in native Bentley BIM/CAD.

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

- A list of all submitted files. The list should include a description, directory, and file name for each file submitted. For all CAD sheets, include the sheet title and sheet number. Identify files that have been produced from the submitted Model and Facility Data.

### 3.2. Initial Design Conference Submittal.

3.2.1. Submit a digital copy of the Plan where, in addition to Paragraph 3.1.4, the USACE Geographic District BIM Manager will coordinate with the USACE CoS BIM Manager to confirm acceptability of the Plan or advise as to additional processes or activities necessary to be incorporated.

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

### 3.3. Interim Design Submittals.

3.3.1. BIM and CAD Data. The Model shall include the requirements identified in Paragraph 2.2.4 as applicable to the Interim Design package(s).

### 3.4. Final Design Submissions and Design Complete Submittals.

3.4.1. BIM and CAD Data. The Model shall include the requirements identified in Paragraph 2.2.4. Acceptance according to Paragraph 3.1.4 is required before commencement of construction, as described in Paragraph 3.7.6 of Section 01 33 16.

3.5. Construction Submittals – Over-The-Shoulder Progress Reviews. Periodic quality control meetings or construction progress review meetings shall include quality control reviews on the implementation and use of the Model, including interference management and design change tracking information.

3.6. Final As-Built BIM and CAD Data Submittal. Submit the final Model, Facility Data, and CAD files reflecting as-built conditions for Government Approval, as specified in Section 01 78 02.00 10, PROJECT CLOSEOUT.

## 4.0 Section 4 – BIM Model Minimum Requirements and Output

4.1. General Provisions. The deliverable Model shall be developed to include the systems described below as they would be built and the processes of installing them, and to reflect final as-built conditions. The deliverable model at the interim design stage and at the final design stage (“released for construction”) shall be developed to include as many of the systems described below as are necessary and appropriate at that design stage.

4.2. Architectural/Interior Design. The Architectural systems Model may vary in level of detail for individual elements, but at a minimum must include all features that would be included on a quarter inch (1/4”=1’0”) scaled drawing. Additional minimum Model requirements include:

4.2.1. Spaces. The Model shall include spaces defining accurate net square footage and net volume, and holding data for the room finish schedule for including room names and numbers. Include Programmatic Information provided by the Government or validated program to verify design space against programmed space, using this information to validate area quantities.

4.2.2. Walls and Curtain Walls. Each wall shall be depicted to the exact height, length, width and ratings (thermal, acoustic, fire) to properly reflect wall types. The Model shall include all walls, both interior and exterior, and the necessary intelligence to produce accurate plans, sections and elevations depicting these design elements.

4.2.3. Doors, Windows and Louvers. Doors, windows and louvers shall be depicted to represent their actual size, type and location. Doors and windows shall be modeled with the necessary intelligence to produce accurate window and door schedules.

- 4.2.4. Roof. The Model shall include the roof configuration, drainage system, penetrations, specialties, and the necessary intelligence to produce accurate plans, building sections and generic wall sections where roof design elements are depicted.
- 4.2.5. Floors. The floor slab shall be developed in the structural Model and then referenced by the architectural Model for each floor of the Project building.
- 4.2.6. Ceilings. All heights and other dimensions of ceilings, including soffits, ceiling materials, or other special conditions shall be depicted in the Model with the necessary intelligence to produce accurate plans, building sections and generic wall sections where ceiling design elements are depicted.
- 4.2.7. Vertical Circulation. All continuous vertical components (i.e., non-structural shafts, architectural stairs, handrails and guardrails) shall be accurately depicted and shall include the necessary intelligence to produce accurate plans, elevations and sections in which such design elements are referenced.
- 4.2.8. Architectural Specialties and Woodwork. All architectural specialties (i.e., toilet room accessories, toilet partitions, grab bars, lockers, and display cases) and woodwork (i.e., cabinetry and counters) shall be accurately depicted with the necessary intelligence to produce accurate plans, elevations and sections in which such design elements are referenced.
- 4.2.9. Signage. The Model shall include all signage and the necessary intelligence to produce accurate plans and schedules.
- 4.2.10. Schedules. Provide door, window, hardware sets using BHMA designations, flooring, wall finish, and signage schedules from the Model, indicating the type, materials and finishes used in the design.
- 4.3. Furniture. The furniture systems Model may vary in level of detail for individual elements within a Model, but at a minimum must include all features that would be included on a quarter inch (1/4"=1'0") scaled drawing, and have necessary intelligence to produce accurate plans. Representation of furniture elements is to be 2D. Contractor may provide a minimal number of 3D representations as examples. Examples of furniture include, but are not limited to, desks, furniture systems, seating, tables, and office storage.
- 4.3.1. Furniture Coordination. Furniture that makes use of electrical, data or other features shall include the necessary intelligence to produce coordinated documents and data.
- 4.4. Equipment. The Model may vary in level of detail for individual elements within a Model. Equipment shall be depicted to meet layout requirements with the necessary intelligence to produce accurate plans and minimum schedules depicting their configuration. Examples of equipment include but are not limited to copiers, printers, refrigerators, ice machines and microwaves.
- 4.4.1. Schedules. Provide furniture and equipment schedules from the model indicating the materials, finishes, mechanical, and electrical requirements.
- 4.5. Structural. The structural systems Model may vary in level of detail for individual elements, but at a minimum must include all features that would be included on a quarter inch (1/4"=1'0") scaled drawing. Additional minimum Model requirements include:
- 4.5.1. Foundations. All necessary foundation and/or footing elements, with necessary intelligence to produce accurate plans and elevations
- 4.5.2. Floor Slabs. Structural floor slabs shall be depicted, including all necessary recesses, curbs, pads, closure pours, and major penetrations accurately depicted.
- 4.5.3. Structural Steel. All steel columns, primary and secondary framing members, and steel bracing for the roof and floor systems (including decks), including all necessary intelligence to produce accurate structural steel framing plans and related building/wall sections.
- 4.5.4. Cast-in-Place Concrete. All walls, columns, and beams, including necessary intelligence to produce accurate plans and building/wall sections depicting cast-in-place concrete elements.

- 4.5.5. Expansion/Contraction Joints. Joints shall be accurately depicted.
- 4.5.6. Stairs. The structural Model shall include all necessary openings and framing members for stair systems, including necessary intelligence to produce accurate plans and building/wall sections depicting stair design elements.
- 4.5.7. Shafts and Pits. The structural Model shall include all necessary shafts, pits, and openings, including necessary intelligence to produce accurate plans and building/wall sections depicting these design elements.
- 4.6. Mechanical. The mechanical systems Model may vary in level of detail for individual elements, but at a minimum must include all features that would be included on a quarter inch (1/4"=1'0") scaled drawing. Small diameter (less than 1-1/2" NPS) field-routed piping is not required in the model. Additional minimum Model requirements include:
- 4.6.1. HVAC. All necessary heating, ventilating, air-conditioning and specialty equipment, including air distribution ducts for supply, return, and ventilation and exhaust ducts, including control system, registers, diffusers, grills and hydronic baseboards with necessary intelligence to produce accurate plans, elevations, building/wall sections and schedules.
- 4.6.1.1. Mechanical Piping. All necessary piping and fixture layouts, and related equipment, including necessary intelligence to produce accurate plans, elevations, building/wall sections, and schedules.
- 4.6.2. Plumbing. All necessary plumbing piping and fixture layouts, floor and area drains, and related equipment, including necessary intelligence to produce accurate plans, elevations, building/wall sections, riser diagrams, and schedules.
- 4.6.3. Equipment Clearances. All HVAC and Plumbing equipment clearances shall be modeled for use in interference management and maintenance access requirements.
- 4.6.4. Elevator Equipment. The Model shall include the necessary equipment and control system, including necessary intelligence to produce accurate plans, sections and elevations depicting these design elements.
- 4.7. Electrical/Telecommunications. The electrical systems Model may vary in level of detail for individual elements, but at a minimum must include all features that would be included on a quarter inch (1/4"=1'0") scaled drawing. Small diameter (less than 1-1/2"Ø) field-routed conduit is not required in the model. Additional minimum Model requirements include:
- 4.7.1. Interior Electrical Power and Lighting. All necessary interior electrical components (i.e., lighting, receptacles, special and general purpose power receptacles, lighting fixtures, panelboards, cable trays and control systems), including necessary intelligence to produce accurate plans, details and schedules. Lighting and power built into furniture/equipment shall be modeled.
- 4.7.2. Special Electrical Systems. All necessary special electrical components (i.e., security, Mass Notification, Public Address, nurse call and other special occupancies, and control systems), including necessary intelligence to produce accurate plans, details and schedules.
- 4.7.3. Grounding Systems. Grounding Systems. All necessary grounding components (i.e., lightning protection systems, static grounding systems, communications grounding systems, bonding), including necessary intelligence to produce accurate plans, details and schedules.
- 4.7.4. Communications. All existing and new communications service controls and connections, both above ground and underground with necessary intelligence to produce accurate plans, details and schedules. Cable tray routing shall be modeled without detail of cable contents.
- 4.7.5. Exterior Building Lighting. All necessary exterior lighting with necessary intelligence to produce accurate plans, elevations and schedules. The exterior building lighting Model shall include all necessary lighting, relevant existing and proposed support utility lines and equipment required with necessary intelligence to produce accurate plans, details and schedules.

4.7.6. Equipment Clearances. The model shall incorporate and define all electrical and communications working spaces, clearances, and required access

4.8. Fire Protection. The fire protection system Model may vary in level of detail for individual elements, but at a minimum must include all features that would be included on a quarter inch (1/4"=1'0") scaled drawing. Additional minimum Model requirements include:

4.8.1. Fire Protection System. All relevant fire protection components (i.e., branch piping, sprinkler heads, fittings, drains, pumps, tanks, sensors, control panels) with necessary intelligence to produce accurate plans, elevations, building/wall sections, riser diagrams, and schedules. All fire protection piping shall be modeled.

4.8.2. Fire Alarms. Fire alarm/mass notification devices and detection system shall be indicated with necessary intelligence to produce accurate plans depicting them.

4.9. Civil. The civil Model may vary in level of detail for individual elements, but at a minimum must include all features that would be included on a one inch (1"=100') scaled drawing. Additional minimum Model requirements include:

4.9.1. Terrain (DTM). All relevant site conditions and proposed grading, including necessary intelligence to produce accurate Project site topographical plans and cross sections.

4.9.2. Drainage. All existing and new drainage piping, including upgrades thereto, including necessary intelligence to produce accurate plans and profiles for the Project site.

4.9.3. Storm Water and Sanitary Sewers. All existing and new sewer structures and piping, including upgrades thereto, on the Project site with necessary connections to mains or other distribution points as appropriate, including necessary intelligence to produce accurate plans and profiles for the Project site.

4.9.4. Utilities. All necessary new utilities connections from the Project building(s) to the existing or newly-created utilities, and all existing above ground and underground utility conduits, including necessary intelligence to produce accurate plans and site-sections.

4.9.5. Roads and Parking. All necessary roadways and parking lots or parking structures, including necessary intelligence to produce accurate plans, profiles and cross-sections.

## **5.0 Section 5 - Ownership and Rights in Data**

5.1. Ownership. The Government has ownership of and rights at the date of Closeout Submittal to all CAD files, BIM Model, and Facility Data developed for the Project in accordance with FAR Part 27, clauses incorporated in Section 00 72 00, Contract Clauses and Special Contract Requirement 1.14 GOVERNMENT RE-USE OF DESIGN (Section 00 73 00). The Government may make use of this data following any deliverable.

## **6.0 Section 6 – Contractor Electives**

6.1. Applicable Criteria. If the Contractor elected to include one or more of the following features as an elective in its accepted contract proposal for additional credit during the source selection, as described in the proposal submission requirements and evaluation criteria, the following criteria are requirements, as applicable to those elective feature(s).

6.2. COBIE Compliance. The Model and Facility Data for the Project shall fulfill Construction Operations Building Information Exchange (COBIE) requirements as defined by the Whole Building Design Guide organization, including all requirements for the indexing and submission of Portable Document Format (PDF) and other appropriate file formats that would otherwise be printed and submitted in compliance with Project operations and maintenance handover requirements.

6.3. Project Scheduling using the Model. In the BIM Execution Plan and during the Preliminary BIM Execution Plan Review, provide an overview of the use of BIM in the development and support of the project construction schedule.

6.3.1. Submittal Requirements. During the Submittal stages, the Contractor shall deliver the construction schedule with information derived from the Model.

6.3.1.1. Construction Submittals – Over-The-Shoulder Progress Reviews. Periodic quality control meetings or construction progress review meetings shall include quality control reviews on the implementation and use of the Model for project scheduling.

6.4. Cost Estimating. In the BIM Execution Plan and during the Preliminary BIM Execution Plan Review, provide an overview of the use of BIM in the development and support of cost estimating requirements, or other applications such as cost analysis and estimate validation.

6.4.1. Submittal Requirements. During the Submittal stages, the Contractor shall deliver cost estimating information derived from the Model.

6.4.2. Project completion. At project completion, the Contractor shall provide an MII (Micro Computer Aided Cost Estimating System Generation II) Cost Estimate which follows the USACE Cost Engineering Military Work Breakdown System (WBS), a modified Uniformat, to at least the sub-systems level and uses quantity information supplied directly from BIM output to the maximum extent possible, though other "Gap" quantity information will be included as necessary for a complete and accurate cost estimate.

6.4.2.1. Sub system level extracted quantities from the BIM for use within the estimate shall be provided according to how detailed line items or tasks should be installed/built so that accurate costs can be developed and/or reflected. Therefore, when developing a BIM, the designer shall be cognizant of what tasks need to be separated appropriately at the beginning stages of model development, such as tasks done on the first floor versus the same task on higher floors that will be more labor intensive and therefore need to have a separate quantity and be priced differently. Tasks and their extracted quantities from the BIM shall be broken down by their location (proximity in the structure) as well as the complexity of its installation.

6.4.2.2. At all design stages it shall be understood that BIM output as described in this document will not generate all quantities that are necessary in order to develop a complete and accurate cost estimate of the project based on the design. An example of this would be plumbing that is less than 1.5" diameter and therefore not expected to be modeled due to granularity; this information is commonly referred to as The Gap. Quantities from The Gap and their associated costs shall be included in the final project actual cost estimates as well.

6.5. Other Analyses and Reports. Structural, energy and efficiency, EPACT 2005 & EISA 2007, lighting design, daylighting, electrical power, psychrometric processing, shading, programming, LEED, fire protection, code compliance, Life Cycle Cost, acoustic, plumbing.

## **7.0 Section 7 – BIM Project Execution Plan Template**

7.1. Contractors will utilize the latest version of the USACE BIM PROJECT EXECUTION PLAN (USACE PxP) Template to develop an acceptable Plan. The template can be downloaded from the CAD/BIM Technology Center website.





**ATTACHMENT G****DESIGN SUBMITTAL DIRECTORY AND SUBDIRECTORY FILE ARRANGEMENT**

Organize electronic design submittal files in a subdirectory/file structure in accordance with the following table. The Contractor may suggest a slightly different structure, subject to the discretion of the government.

**Design Submittal Directory and Subdirectory File Arrangement.**

Directory	Sub-Directory	Sub-Directory or Files	Files
Submittal/Package Name	Narratives	PDF file or files with updated design narrative for each applicable design discipline	
	Drawings	PDF (subdirectory)	Single PDF file with all applicable drawing sheets - bookmarked by sheet number and name
		BIM (subdirectory) See Attachment F.	BIM project folder (with files) per the USACE Workspace. Include an Excel drawing index file with each drawing sheet listed by sheet #, name and corresponding dgn file name (Final Design & Design Complete only)
	Design Analysis & Calculations	Individual PDF files containing design analysis and calculations for each discipline applicable to the submittal	
		PDF file with Fire Protection and Life Safety Code Review checklist	
	LEED	PDF file with updated Leed Check List	
		PDF file or files with LEED Templates for each point with applicable documentation included in each file.	
		LEED SUBMITTALS	
	Energy Analysis	PDF with baseline energy consumption analysis	
		PDF with actual building energy consumption analysis	
	Specifications	Single PDF file with table of contents and all applicable specifications sections.	
		Submittal Register (Final Design & Design Complete submittal only)	
	Design Quality Control	PDF file or files with DQC checklist(s) and/or statements	
	Building Rendering(s)	PDF file of rendering for each building type included in contract (Final Design & Design Complete).	

**SECTION 01 45 04.00 10  
CONTRACTOR QUALITY CONTROL**

**1.0 GENERAL**

1.1. REFERENCES

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 responsible for the overall construction activities at the site, including quality and production. The site project superintendent shall maintain a physical presence at the site at all times, except as otherwise acceptable to the Contracting Officer, and shall be responsible for all construction and construction related activities at the site.

### 3.2. QUALITY CONTROL PLAN

Furnish for Government review, not later than 30 days after receipt of notice to proceed, the Contractor Quality Control (CQC) Plan proposed to implement the requirements of the Contract Clause titled "Inspection of Construction." The plan shall identify personnel, procedures, control, instructions, tests, records, and forms to be used. The Government will consider an interim plan for the first 30 days of operation. Design and construction may begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of work to be started. The Government will not permit work outside of the features of work included in an accepted interim plan to begin until acceptance of a CQC Plan or another interim plan containing the additional features of work to be started. Where the applicable Code issued by the International Code Council calls for an inspection by the Building Official, the Contractor shall include the inspections in the Quality Control Plan and shall perform the inspections. The Designer of Record shall develop a program for any special inspections required by the applicable International Codes and the Contractor shall perform these inspections, using qualified inspectors. Include the special inspection plan in the QC Plan.

### 3.2.1. Content of the CQC Plan

The CQC Plan shall include, as a minimum, the following to cover all design and construction operations, both onsite and offsite, including work by subcontractors, fabricators, suppliers, and purchasing agents subcontractors, designers of record, consultants, architect/engineers (AE), fabricators, suppliers, and purchasing agents:

3.2.1.1. A description of the quality control organization. Include a chart showing lines of authority and an acknowledgment that the CQC staff shall implement the three phase control system for all aspects of the work specified. A CQC System Manager shall report to the project superintendent or someone higher in the contractor's organization.

3.2.1.2. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function. Also include those responsible for performing and documenting the inspections required by the International Codes and the special inspection program developed by the designer of record.

3.2.1.3. A copy of the letter to the CQC System Manager, signed by an authorized official of the firm, which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop work which is not in compliance with the contract. The CQC System Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities. Furnish copies of these letters.

3.2.1.4. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers, and purchasing agents subcontractors, designers of record, consultants, architect engineers (AE), offsite fabricators, suppliers, and purchasing agents. These procedures shall be in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.

3.2.1.5. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. Use only Government approved Laboratory facilities.

3.2.1.6. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.

3.2.1.7. Procedures for tracking design and construction deficiencies from identification through acceptable corrective action. These procedures shall establish verification that identified deficiencies have been corrected.

3.2.1.8. Reporting procedures, including proposed reporting formats.

3.2.1.9. A list of the definable features of work. A definable feature of work is a task, which is separate and distinct from other tasks, has separate control requirements, and may be identified by different trades or disciplines, or it may be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work, there are frequently more than one definable feature under a particular section. This list will be agreed upon during the coordination meeting.

3.2.1.10. A list of all inspections required by the International Codes and the special inspection program required by the code and this contract.

### 3.2.2. Additional Requirements for Design Quality Control (DQC) Plan

The following additional requirements apply to the Design Quality Control (DQC) plan:

3.2.2.1. The Contractor's QCP Plan shall provide and maintain a Design Quality Control (DQC) Plan as an effective quality control program which will assure that all services required by this design-build contract are performed and provided in a manner that meets professional architectural and engineering quality standards. As a minimum, competent, independent reviewers identified in the DQC Plan shall review all documents. Use personnel who were not involved in the design effort to produce the design to perform the independent technical review (ITR). The ITR is intended as a quality control check of the design. Include, at least, but not necessarily limited to, a review of the contract requirements (the accepted contract or task order proposal and amended RFP), the basis of design, design calculations, the design configuration management documentation and check the design documents for

errors, omissions, and for coordination and design integration. The ITR team is not required to examine, compare or comment concerning alternate design solutions but should concentrate on ensuring that the design meets the contract requirements. Correct errors and deficiencies in the design documents prior to submitting them to the Government.

3.2.2.2. Include in the DQC Plan the discipline-specific checklists to be used during the design and quality control of each submittal. Submit these completed checklists at each design phase as part of the project documentation.

3.2.2.3. A Design Quality Control Manager, who has the responsibility of being cognizant of and assuring that all documents on the project have been coordinated, shall implement the DQC Plan. This individual shall be a person who has verifiable engineering or architectural design experience and is a registered professional engineer or architect. Notify the Government, in writing, of the name of the individual, and the name of an alternate person assigned to the position.

### 3.2.3. Acceptance of Plan

Government acceptance of the Contractor's plan is required prior to the start of design and construction. Acceptance is conditional and will be predicated on satisfactory performance during the design and construction. The Government reserves the right to require the Contractor to make changes in his CQC Plan and operations including removal of personnel, as necessary, to obtain the quality specified.

### 3.2.4. Notification of Changes

After acceptance of the CQC Plan, notify the Government in writing of any proposed change. Proposed changes are subject to Government acceptance.

## 3.3. COORDINATION MEETING

After the Postaward Conference, before start of design or construction, and prior to acceptance by the Government of the CQC Plan, the Contractor and the Government shall meet and discuss the Contractor's quality control system. Submit the CQC Plan for review a minimum of 7 calendar days prior to the Coordination Meeting. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations, design activities, control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. The Government will prepare minutes of the meeting for signature by both parties. The minutes shall become a part of the contract file. There may be occasions when either party will call for subsequent conferences to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures which may require corrective action by the Contractor.

## 3.4. QUALITY CONTROL ORGANIZATION

### 3.4.1. Personnel Requirements

The requirements for the CQC organization are a CQC System Manager, a Design Quality Manager, and sufficient number of additional qualified personnel to ensure contract compliance. The CQC organization shall also include personnel identified in the technical provisions as requiring specialized skills to assure the required work is being performed properly. The Contractor's CQC staff shall maintain a presence at the site at all times during progress of the work and have complete authority and responsibility to take any action necessary to ensure contract compliance. The CQC staff shall be subject to acceptance by the Contracting Officer. Provide adequate office space, filing systems and other resources as necessary to maintain an effective and fully functional CQC organization. Promptly furnish complete records of all letters, material submittals, shop drawing submittals, schedules and all other project documentation to the CQC organization. The CQC organization shall be responsible to maintain these documents and records at the site at all times, except as otherwise acceptable to the Contracting Officer.

### 3.4.2. CQC System Manager

Identify as CQC System Manager an individual within the onsite work organization who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. The CQC System

Manager shall be a graduate engineer, graduate architect, or a BA/BS graduate of an ACCE accredited construction management college program. The CQC system Manager may alternately be an engineering technician with at least 2 years of college and an ICC certification as a Commercial Building Inspector (Residential Building Inspector certification will be required for Military Family Housing projects). In addition, the CQC system manager shall have a minimum of 5 years construction experience on construction similar to this contract. The CQC System Manager shall be on the site at all times during construction and shall be employed by the prime Contractor. Assign the CQC System Manager no other duties (except may also serve as Safety and Health Officer, if qualified and if allowed by Section 00 73 00). Identify an alternate for the CQC System Manager in the plan to serve in the event of the System Manager's absence. The requirements for the alternate shall be the same as for the designated CQC System Manager but the alternate may have other duties in addition to serving in a temporary capacity as the acting QC manager.

### 3.4.3. CQC Personnel

3.4.3.1. In addition to CQC personnel specified elsewhere in the contract provide specialized CQC personnel to assist the CQC System Manager in accordance with paragraph titled Area Qualifications.

3.4.3.2. These individuals may be employees of the prime or subcontractor; be responsible to the CQC System Manager; **are not intended to be full time, but must be physically present at the construction site during work on their areas of responsibility**; have the necessary education and/or experience in accordance with the experience matrix listed herein. These individuals may perform other duties but must be allowed sufficient time to perform their assigned quality control duties as described in the Quality Control Plan. **One person may cover more than one area, provided that they are qualified to perform QC activities for the designated areas below and provided that they have adequate time to perform their duties:**

### 3.4.4. Experience Matrix

#### 3.4.4.1. Area Qualifications

3.4.4.1.1. Civil - Graduate Civil Engineer or (BA/BS) graduate in construction management with 4 years experience in the type of work being performed on this project or engineering technician with 5 yrs related experience.

3.4.4.1.2. Mechanical - Graduate Mechanical Engineer or (BA/BS) graduate in construction management with 4 yrs related experience or engineering technician with an ICC certification as a Commercial Mechanical Inspector with 5 yrs related experience.

3.4.4.1.3. Electrical - Graduate Electrical Engineer or (BA/BS) graduate in construction management with 4 yrs related experience or engineering technician with an ICC certification as a Commercial Electrical Inspector with 5 yrs related experience.

3.4.4.1.4. Structural - Graduate Structural Engineer or (BA/BS) graduate in construction management with 4 yrs related experience or person with an ICC certification as a Reinforced Concrete Special Inspector and Structural Steel and Bolting Special Inspector (as applicable to the type of construction involved) with 5 yrs related experience.

3.4.4.1.5. Plumbing - Graduate Mechanical Engineer or (BA/BS) graduate in construction management with 4 yrs related experience, or person with an ICC certification as a Commercial Plumbing Inspector with 5 yrs related experience.

3.4.4.1.6. Concrete, Pavements and Soils Materials Technician (present while performing tests) with 2 yrs experience for the appropriate area

3.4.4.1.7. Testing, Adjusting and Balancing Specialist must be a member (TAB) Personnel of AABC or an experienced technician of the firm certified by the NEBB (present while testing, adjusting, balancing).

3.4.4.1.8. Design Quality Control Manager Registered Architect or Professional Engineer (not required on the construction site)

3.4.4.1.9. Registered Fire Protection Engineer with 4 years related experience or engineering technician with 5 yrs related experience (but see requirements for Fire Protection Engineer of Record to witness final testing in Section 01 10 00, paragraph 5.10, Fire Protection).

3.4.4.1.10. QC personnel assigned to the installation of the telecommunication system or any of its components shall be Building Industry Consulting Services International (BICSI) Registered Cabling Installers, Technician Level. Submit documentation of current BICSI certification. In lieu of BICSI certification, QC personnel shall have a minimum of 5 years experience in the installation of the specified copper and fiber optic cable and components. They shall have factory or factory approved certification from each equipment manufacturer indicating that they are qualified to install and test the provided products. QC personnel shall witness and certify the testing of telecommunications cabling and equipment.

#### 3.4.5. Additional Requirement

In addition to the above experience and/or education requirements the CQC System Manager shall have completed the course entitled "Construction Quality Management for Contractors". This course is periodically offered at Association of General Contractors of Washington Education Foundation ([www.constructionfoundation.agcwa.com](http://www.constructionfoundation.agcwa.com)). 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:  
U.S. Army Corps of Engineers - Materials Testing Center  
[Not Supplied - ConstructionReqQC : LAB\_ATTEN]  
3909 Halls Ferry Road  
Vicksburg, MS 39180-6133
- For other deliveries:  
U.S. Army Corps of Engineers

Lou Feller  
Building 2015, 3rd Floor  
Fort Lewis, WA 98433-9500

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 02.0002**  
**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 02.0002

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REQUEST FOR PROPOSAL W912DW-09-T-5400

**864<sup>th</sup> ENGINEERING BATTALION SMALL TACTICAL  
EQUIPMENT MAINTENANCE FACILITIES (TEMF)**

**PN 069167, FY 2009**

JOINT BASE LEWIS-McCHORD, WASHINGTON

Appendix A: Geotechnical Information

# **Draft Geotechnical Report Brigade Complex TEMF Modification Joint Base Lewis-McChord Washington**

**Submitted to  
Frankfurt-Short-Bruza Associates, P.C. &  
U.S. Army Corp of Engineers, Seattle District**

**Prepared by  
CivilTech Engineering Inc.  
10800 NE 8<sup>th</sup> Street, Suite 820  
Bellevue, WA 98004  
(425) 453-6488**

**CTE Project #28021-01A**

**May 26, 2010**





10800 NE 8<sup>th</sup> Street,  
Suite 820  
Bellevue, WA 98004

Ph. (425) 453-6488  
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May 26, 2010

Ms. Jennifer L. Manuel  
Frankfurt-Short-Bruza Associates, P.C.  
5801 Broadway Extension, Suite 500  
Oklahoma City, Oklahoma 73118-7436

**RE: DRAFT Geotechnical Report  
Brigade Complex TEMF Modification  
Joint Base Lewis-McChord, Washington  
CivilTech Project No. 28021-01A**

Dear Ms. Manuel:

We are pleased to submit herewith our Geotechnical Report for the above referenced project. This report contains a description of the subsurface conditions and summarizes our recommendations for the design and construction of this project.

We appreciate the opportunity to be of service on this project. If you have any questions or need additional information, please contact our office.

Sincerely,  
CivilTech Engineering

Mark A. Wicklund, PE  
Geotechnical Engineer

Dustin C. Ong, PE  
President

Monday, August 09, 2010



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## Introduction

This report presents the results of our geotechnical engineering study for the proposed Joint Base Lewis-McChord, Brigade Complex Tactical Equipment Maintenance Facility (TEMF) modification project, which includes a Brigade Complex TEMF building, associated parking areas and stormwater facility. The current study is a supplement to our earlier geotechnical report entitled *Draft Geotechnical Report, Brigade Complex - Fort Lewis, Washington* dated Feb 6, 2009 and provides information for a new revised site location for the TEMF portion of the project. The general vicinity of the site is shown on the Vicinity Map in Appendix A, Figure 1.

This report summarizes subsurface conditions and geotechnical engineering recommendations resulting from our field exploration, laboratory testing, and engineering analyses. The information and recommendations provided here are intended for the design and construction of the Brigade Complex TEMF modification project, and are subject to the limitations noted at the end of this report.

### 1.0 Project Background

The Brigade Complex TEMF modification project will consist of construction of a vehicle maintenance facility, organizational parking, organizational unit storage, and a stormwater facility associated with the FY09 Brigade Complex, Project 069167, Task Order #0002 on a site in the northern portion of Joint Base Lewis-McChord, Washington. The site is bordered on the northwest by "D" Street, on the southwest by a newly constructed 7<sup>th</sup> Street, and on the east and south by an existing TEMF facility and adjoining property. Based on the existing ground elevations at the site and the information provided, the majority of the site is generally level and we anticipate that only minimal cuts and fills will be needed in order to achieve the design grades. However, part of the TEMF building area is sloped and the ground surface in the southern building area is about 6 feet lower than the northern building area. It is anticipated that some cuts and/or fills will likely be required to level the grade in the building and surrounding paved areas.

The TEMF building will be one story in height. We anticipate column loads to be on the order of 60 kips (gravity) to 120 kips (gravity plus seismic). The building will be surrounded by concrete pavement covering an area roughly 270 feet by 370 feet, which will include a concrete apron adjacent to the building, vehicle circulation access and storage. A parking area south of the TEMF building will be mostly gravel covered, except on the eastern side where some concrete paved parking will be provided. A new stormwater facility will be provided near the southwestern perimeter of the site, adjacent to 7<sup>th</sup> Street.

### 2.0 Purpose and Scope

The purpose of our geotechnical engineering exploration for the proposed Brigade Complex TEMF project was to obtain an overview of the subsurface conditions at the project site. The subsurface information was used to develop preliminary geotechnical engineering recommendations pertinent to the design of the Brigade Complex TEMF modification project. The scope of our work for this project included the following tasks:

- Review of available geologic and soil information related to the proposed project.
- Coordination of the permits, field exploration, utility clearance, and site access.

- Mobilization and demobilization of a truck-mounted drill rig and support trucks, with operators to and from the project site.
- Drilling and sampling of five borings at the project site to depths ranging from 5.5 feet to 15.5 feet below the existing ground surface.
- Logging of the borings by an engineer of our firm.
- Field and laboratory testing of selected soil samples obtained during our field exploration to aid in classifying the material and evaluating its engineering properties.
- Engineering analyses of the field and laboratory data.
- Preparation of a geotechnical report summarizing our work on the project and presenting our findings and recommendations.
- Quality assurance of our work on the project by a Principal Engineer of our firm.
- Detailed descriptions of our field exploration and logs are presented in Appendix B of this report. Laboratory test results are presented in Appendix C.

## 3.0 Geology

### 3.1 Regional Geology

The project site is located within the southern portion of the Puget Sound lowland, an elongated structural and topographic depression that is bounded to the east by the Cascade Mountains and to the west by the Olympic Mountains. During the most recent geologic period (the Quaternary), glacial ice repeatedly advanced into the Puget Sound lowland, modifying the landscape by scour and deposition. The most recent phase of this glaciation occurred about 15,000 years ago when the Vashon stade of the Fraser ice sheet advanced into the Puget Sound lowland, terminating about 15 miles south of Olympia, Washington. At its maximum, the ice thickness may have been nearly 3,000 feet in the local area. Melting of the glacial ice left behind characteristic deposits and landforms, which are the soil materials and landforms observable today in most of the area. The present surficial geology of the Puget Sound region is primarily a product of the recent glaciations and post-glacial depositions. These deposits include advance drift deposits, recessional drift deposits, and glacial till.

### 3.2 Site Geology

Site geology conditions are inferred from review of a geologic map by Walsh (1987), site reconnaissance, and subsurface explorations completed in this study and by others in the site vicinity and information provided by others. Based on our review, surficial deposits in the project area are mapped as Pleistocene-age glacial deposits consisting of undifferentiated Vashon Drift, mainly composed of recessional and proglacial stratified outwash sand and gravel, locally containing silt and clay, and also containing lacustrine deposits and ice-contact stratified drift. Soils encountered at depth in our borings are generally interpreted as recessional outwash sand and gravel, which is consistent with the mapped unit.

## 4.0 Site Conditions

The modified TEMF site is irregular in shape and measures roughly 900 feet by 1100 feet in overall plan dimension. It is composed of the proposed TEMF facility on the north side,

connected to a proposed parking area and stormwater facility on the south side. The proposed TEMF building site with surrounding concrete apron and circulation lanes covers an area roughly 270 feet by 370 feet. This area is currently used for gravel parking on the north side and sloped lawn area on the south side. The combined parking and stormwater facility area is irregular in shape and measures roughly 890 feet by 430 feet in overall plan dimension. The majority of this area is currently undeveloped and grass covered, with scattered trees, but on the eastern side it is partially cleared and is currently being used to stockpile spoils from the adjoining construction site.

## **5.0 Subsurface Conditions**

### **5.1 Subsurface Explorations**

The subsurface conditions were explored by the drilling of five borings with hollow stem auger methods. The borings, designated B-1-10 through B-5-10, were drilled on May 3, 2010 at the TEMF site, and were completed to depths of 5.5 feet to 15.5 feet. The approximate locations of the borings are shown on the Site and Exploration Plan sheets in Appendix A, Figures 2a and 2b. Detailed descriptions of the materials encountered in the explorations are presented on the logs in Appendix B, Plates B-1 through B-5.

No obstructions were encountered during drilling, however drilling was slowed and was difficult at times in areas where coarse gravels were encountered.

### **5.2 Subsurface Soil and Groundwater Conditions**

Subsurface soil and groundwater conditions at the proposed TEMF site were investigated in three borings (B-1-10, B-2-10 and B-3-10) drilled in the proposed building area and two borings (B-4-10 and B-5-10) drilled at the proposed parking and stormwater facility areas, respectively. In general, soils encountered in our borings consisted of medium dense to very dense, recessional outwash sand and gravel with trace to some silt. Fill soils were encountered in the central and southern building area to depths of 2 to 3½ feet. Fill soils consisted of medium dense, mixed, sand, gravel and topsoil.

Groundwater was encountered at a depth of about 13 to 13.5 feet in borings B-2-10 and B-3-10 at the proposed TEMF building location. This depth corresponds to an approximate elevation of 210 to 210.5 feet. It should be noted that groundwater levels could fluctuate depending on the time of year, precipitation, site utilization, location and other factors.

Surface drainage at the site is currently provided by percolation into underlying soils. No standing water was noted at the time of our visits.

### **5.3 Expansive Soils**

On-site soils were evaluated for potential for expansion. Soil expansion typically occurs in soils containing significant quantities of swelling clay minerals, with moisture contents near the plastic limit, and having a source of water for expansion. Clay minerals which are known to swell are particularly montmorillonite and to a lesser extent illite and kaolinite. Swelling clay soils are not common in the Puget Sound area, and were not observed in any of our samples. Based on the soils encountered at the site, the potential for soil expansion, or associated heave, is minimal in our opinion.

## 5.4 Corrosivity Conditions

Corrosivity testing performed on representative samples of soil obtained in the proposed building areas yielded a minimum electrical resistivity of 300,000 ohm-cm and a pH ranging from 5.63 to 6.94 and a maximum sulfate content of 10 ppm. In general, the samples may be considered mildly corrosive. Generally soils are considered “mildly corrosive” if the sulfate level is below 200 ppm, pH is between 5 and 10 and resistivity is greater than 3000 ohm-cm. Table 1, below, presents all test results.

Soil Sample	Depth (feet)	pH	Electrical Resistivity (ohm-cm)	Sulfate Content (ppm)
B-1-10 S-1	1	6.02	320,000	10
B-1-10 S-3	4	6.80	300,000	-
B-1-10 S-4	9	6.14	380,000	-
B-2-10 S-2	2.5	6.17	430,000	9.2
B-2-10 S-3	4	6.33	440,000	-
B-2-10 S-4	9	6.94	350,000	-
B-3-10 S-1	1	5.63	410,000	8.9
B-3-10 S-2	2.5	6.15	370,000	-
B-3-10 S-3	4	6.25	360,000	-

Based on the information presented in Table 1, average soil resistivity, pH and sulfate content were calculated for the top 10 feet at each boring, and are presented in Table 2 below.

Boring	Average pH	Average Electrical Resistivity (ohm-cm)	Average Sulfate Content (ppm)
B-1-10	6.32	333,333	10
B-2-10	6.48	406,667	9.2
B-3-10	6.01	380,000	8.9

### 5.4.1 Corrosion of Buried Metallic Piping

For galvanized pipe, a range of pH from 6.0 to 9.5 is generally accepted, along with a minimum resistivity of 1000 to 2000 ohm-cm. Recommendations for aluminized steel pipe

are a pH between 5.0 and 8.5 and a minimum resistivity of 1,000 ohm-cm. Test results indicate that although one sample (B-3-10 S-1 at 2.5 ft depth) had a pH reading slightly lower than the recommended range for galvanized pipe, the average pH and resistivity values for the soils meet the recommendations for galvanized and aluminized steel pipe.

#### **5.4.2 Corrosion of Underground Elements**

Generally accepted guidelines for metallic reinforcement are a pH (acidity) ranging from 5.0 to 10.0, a minimum resistivity of 3,000 ohm-cm and a maximum sulfate content of 200 ppm. All the samples meet these requirements for pH, resistivity and sulfate. In our opinion, the conditions are adequate for construction of underground elements and no special soil treatment will be required.

#### **5.4.3 Recommended Cement Type**

Based on the results of our analysis, sulfate exposure for concrete may be considered negligible (less than 0.10 percent by weight water soluble sulfate in soil). Therefore, no specific cement type will be required for protection and Type 1 (general purpose) cement is recommended. Alternatively, Types 1A (air entraining), III (high early strength) or IIIA (high early strength, air-entraining) may be used, as needed.

### **5.5 Frost Susceptibility**

Frost susceptible soils may exhibit differential heaving, ice segregation, loss of bearing capacity and non-uniform subsidence within the frost depth. Soils may be considered frost susceptible if 10 percent or more particles pass a 0.075 mm sieve or 3 percent or more pass a 0.02 mm sieve. Based on our grain size analysis results, the on-site soils have 10 percent or less passing the 0.075 mm (#200) sieve and may be considered relatively non-susceptible to frost.

Although the maximum measured frost depth in the local area is about 15 inches, a maximum frost depth of 18 inches is generally recommended for foundation design. For pavement design, a maximum frost depth of 24 inches is recommended by the WSDOT *Pavement Guide Interactive* web site for coarse grained soils in the local area.

## **6.0 Seismicity**

### **6.1 Seismic Tectonics**

The project is located in an active seismic region of the Pacific Northwest. The main tectonic feature in the Pacific Northwest is the Cascadia subduction zone where the Juan de Fuca oceanic plate is being subducted under the North American continental plate at the rate of three to four centimeters a year. This subduction is mainly responsible for the seismic and volcanic activity in the region. The seismic activity can be represented in terms of earthquake magnitude (M), a measure of the strength of the earthquake or the strain energy released by it. The large historic earthquakes include the 1949 Olympia (M=7.1), 1965 SeaTac (M=6.5), 2001 Nisqually (M=6.7), and the 1918 (M=7.0) and 1946 (M=7.3) Vancouver Island earthquakes.

In addition to the largest historic earthquakes, recent geologic investigations in the coastal areas of Washington and Oregon have uncovered evidence of the occurrence of several large prehistoric subduction earthquakes. The latest event occurred about 300 years ago and may have been as large as M=8.5. Five other significant earthquakes have also been identified in the last 3,400 years.

There is other evidence supporting the occurrence of a great subduction-zone earthquake in the Pacific Northwest. The evidence is based on the similarity between the seismotectonic environments in the Pacific Northwest and in other subduction zones around the world where great historic earthquakes have occurred. This information suggests that  $M=8.5$  is a reasonable estimate of the magnitude of the earthquake that could potentially occur in the Cascadia subduction zone.

## 6.2 Seismic Source Zones

Three seismic source zones in the region have the potential to produce earthquakes capable of generating strong ground motions at the site. These source zones include the interplate and intraplate segments of the Cascadia subduction zone and the Puget Trough. The interplate segment of the Cascadia subduction zone is the portion of the plate where the Juan de Fuca and North American plates are in contact. This contact region lies approximately between an area offshore and the middle of the coast ranges. The region is assumed to be capable of generating large earthquakes ( $M>8.5$ ).

The intraplate segment of the Cascadia subduction zone is the portion of the Juan de Fuca plate that is underneath the North America plate. This plate segment dips gradually to the east from the middle of the coast ranges, where the top of the plate is approximately 30 km deep to the western edge of the Cascade Range. The 1949 Olympia and 1965 SeaTac earthquakes are recent events associated with the intraplate fault mechanism, located about 30 to 70 km beneath Puget Sound.

The Puget Trough seismic zone is located at relatively shallow depths less than 30 km beneath Puget Sound and includes the Seattle, Whidbey Island, and Rattlesnake faults. This zone has a relatively high seismic activity and a crustal earthquake can occur almost anywhere in the area. Although the largest known earthquake in this zone was  $M<6$ , the Puget Trough is considered capable of generating larger earthquakes ( $M=6.5$  to 7.5).

## 7.0 Conclusions and Recommendations

### 7.1 General

Project plans call for the construction of a TEMF building, and associated parking areas. Borings drilled in the areas of the proposed structure encountered medium dense sand and gravel at relatively shallow depths. The subsurface conditions are, in our opinion, favorable for the use of shallow foundations.

Detailed discussions and recommendations for seismic design criteria, foundations, slab-on-grade floors, pavements and other geotechnical aspects of the project are presented in the subsections that follow.

### 7.2 Seismic Design Considerations

#### 7.2.1 Ground Shaking and Acceleration

In accordance with the USGS 2002 National Seismic Hazard Mapping Project, interpreted, probabilistic ground motion values are presented in Table 3 below. Values are presented for peak ground acceleration (PGA), 0.2 second period spectral acceleration (SA), and 1.0 second period SA for 10 percent and 2 percent probability of exceedence (PE) in 50 years for Site Class B.

<b>Table 3</b>		
<b>Probabilistic Ground Motion Values for Site Class B, in %g</b>		
	<b>10% PE in 50 years</b>	<b>2% PE in 50 years</b>
PGA	30	54
0.2 sec SA	67	118
1.0 sec SA	23	41

### 7.2.2 Site Coefficient

Based on the soil conditions encountered in our borings, we recommend that the site be classified as Site Class D.

### 7.2.3 Liquefaction Potential

Seismically induced liquefaction typically occurs in loose, saturated, sandy and silty materials. Soil liquefaction is a condition where saturated cohesionless soils located near the ground surface undergo a substantial loss of strength due to the build-up of excess pore water pressures resulting from cyclic stress applications induced by earthquakes. Soils most susceptible to liquefaction are loose, uniformly graded, fine-grained sands and soft silts with little cohesion. Liquefaction generally occurs at depths shallower than 50 feet, although it can and has occurred at greater depths. In deeper deposits, the greater overburden pressure is generally sufficient to prevent liquefaction from occurring.

In our opinion, the potential for liquefaction is relatively low due to the type of soils present and the depth of the groundwater table.

## 7.3 Structures

Plans call for the construction of a one-story structure on the site. Column loads for the structure are estimated to be on the order of 60 kips (gravity) to 120 kips (gravity plus seismic). Based on the soils encountered in borings in these areas, shallow foundations appear feasible and are recommended for the proposed structure. The building may contain equipment maintenance pits.

### 7.3.1 Shallow Foundations

Shallow foundations in the building area are anticipated to include spread footings, as well as continuous footings. Based on the soil conditions encountered in borings, allowable bearing pressures, footing widths and other parameters are presented in Table 4, below for embedment depths of 2 and 4 feet. The parameters may be applied to spread and continuous footings.

<b>Table 4</b>		
<b>Footing Design Parameters</b>		
Parameter	Minimum Embedment Depth Below Existing Ground Surface	
	2 feet	4 feet
Soil Unit Weight, $\gamma$ (soil above footing base) (pcf)	120	125
Soil Friction Angle, $\phi$ (degrees)	33	35
Active Earth Pressure Coefficient, $K_a$	0.29	0.27
Passive Earth Pressure Coefficient, $K_p$	3.4	3.7
Friction Coefficient	0.45	0.50
Assumed Minimum Footing Width (feet)	1.5	5
Allowable (1" maximum settlement) Bearing Capacity, $q_{all}$ , (ksf)	3.0	5.0
Subgrade Modulus of 1'x 1' plate, (pci)	150	200

In order to provide adequate bearing conditions for footings, all existing fill material below all footings should be overexcavated to reveal the native, undisturbed, recessional outwash gravel and sand soils. We anticipate that only minor, local overexcavations will be necessary in the northern building area, but overexcavations on the order of 2 to 3.5 feet will be necessary in the central and southern building to remove previously placed topsoil fill soils (see boring logs B-2-10 and B-3-10).

Because foundation stresses are transferred outward as well as downward into the bearing soils, all footing overexcavations should extend horizontally outward from the edge of each footing a distance equal to the overexcavation depth. Therefore, an overexcavation that extends 2 feet below the footing base should extend 2 feet outward from the footing edges, as illustrated in Appendix A, Figure 4.

The allowable bearing pressures presented in Table 4 assume footings are founded on native soils at the indicated embedment depths below existing grades, or on properly compacted fill soils placed atop these soils. In addition to Table 4, above, an allowable bearing pressure of 3,000 psf may be assumed for footings founded on compacted structural fill soils placed atop properly prepared native subgrades. In this case, the design parameters listed for an embedment depth of 2 feet can be assumed. The allowable bearing pressures presented above and in Table 4 are for dead plus live loads, and may be increased by one-third for transient loading, such as wind or seismic forces.

We estimate that footing settlements under the anticipated design loads to be less than 1 inch total with differential settlements on the order of half of that amount ( $\frac{1}{2}$  inch). The majority of the settlement is elastic and should occur as the loads are applied. We do not anticipate any significant additional settlement due to seismic loading.

Lateral loads acting on the structure supported by a shallow foundation system may be resisted by passive earth pressure developed against the embedded near-vertical faces of

the foundation system and by frictional resistance developed between the bottom of the foundation and the supporting subgrade soils. The parameters presented in Table 4, above, may be used to evaluate resistance due to passive pressure and sliding resistance developed between the concrete and the medium dense soils. A factor of safety of 1.5 should be applied to the passive pressure value. Unless covered by pavements or slabs, the passive resistance in the upper 12 inches of soil should be neglected.

Uplift loads may be resisted by a combination of the following: (1) dead weight of the structures and (2) weight of backfill material above the footing, where applicable. The contribution of dead weight from the backfill may be estimated using a unit weight of 120 pcf.

Following excavation, all exposed footing subgrades should be compacted to a minimum of 95 percent relative compaction. Relative compaction refers to the in-place dry density of soil expressed as a percentage of the maximum dry density as determined by ASTM Test Designation D-1557. Footing excavations should be observed by a representative of CivilTech Engineering or a qualified geotechnical engineer prior to placement of reinforcing steel or concrete to confirm the competency of the bearing materials and embedment depths.

If foundations are located next to utility trenches, they should be embedded below a one horizontal to one vertical (1H:1V) imaginary plane extending upward from the bottom edge of the utility trench or as deep as the inverts of the utility lines. This requirement is necessary to avoid surcharging adjacent below-grade structures with additional structural loads and to reduce the potential for foundation settlement. Figure 3 in Appendix A provides a typical detail for footing embedment near a trench.

In general, buildings should be provided with a perimeter footing drain system to collect any seepage water. Footing drains should consist of a perforated pipe with an envelope of pea gravel or washed rock, extending at least 6 inches on all sides of the pipe. The gravel envelope should be wrapped with filter fabric to reduce the migration of fines from the surrounding soils. The drain invert should be installed no more than 8 inches above the base of the perimeter footings. Water from the drains should be directed to a permanent and positive discharge point. Roof and surface runoff water should not discharge into the footing drain system.

### **7.3.2 Slab-On-Grade Floors**

It is anticipated that concrete slabs-on-grade will be required for the buildings. In general, the slab subgrade may be compacted to attain at least 95 percent relative compaction. A 4-inch layer of pea gravel or washed rock should be placed below the slab to serve as a capillary moisture break. To reduce future moisture infiltration and subsequent damage to floor coverings, an impervious moisture vapor barrier, such as a plastic membrane, is recommended on top of the gravel layer. Two inches of moist fine sand should be placed above the plastic membrane to provide protection of the membrane and to aid in curing of the slab concrete. The sand should be moistened slightly prior to concrete placement.

For design of slabs-on-grade, a modulus of subgrade reaction of about 150 pounds per cubic inch (p.c.i.) may be used.

### **7.3.3 Retaining Walls**

Retaining walls are anticipated to include basement walls for equipment maintenance pits and may include low cantilever concrete walls for grade separation in portions of the site. In general, foundations for retaining and below-grade walls should be designed in

accordance with the recommendations presented in the “Shallow Foundations” section of this report. A minimum embedment of 24 inches is recommended for all wall footings.

All permanent retaining structures and below-grade structures should be designed to resist lateral earth pressures due to the adjacent soil and surcharge effects. The recommended lateral earth pressures, expressed in equivalent fluid pressures, for the anticipated retaining structures are presented in the following table.

<b>Table 5</b>		
<b>Lateral Earth Pressures for Design of Retaining Structures</b>		
<b>Retained Soil Type</b>	<b>Wall Condition</b>	<b>Lateral Earth Pressure (PCF)</b> (level ground, above ground water table conditions)
Medium dense to Dense Sand/Gravel or Compacted Fill	Active	35
	At-Rest	55
	Passive	270

Surcharge stresses due to area surcharges, line loads, and point loads within a horizontal distance equal to the height of the wall should be considered in the design. For uniform surcharge stresses imposed on the loaded side of a restrained wall, a rectangular distribution with uniform pressure equal to 45 percent of the vertical surcharge pressure acting on the entire height of the wall may be used in the design. For walls that are free to deflect (cantilever), a rectangular distribution equal to 30 percent of the vertical surcharge pressure acting over the entire height of the wall may be used for design.

Backfill behind retaining walls should meet the requirements for Gravel Backfill for Walls as specified in Section 9-03.12(2) of the Standard Specifications for Road, Bridge, and Municipal Construction by WSDOT and APWA. The backfill should be moisture-conditioned to near the optimum moisture and compacted to between 90 and 95 percent relative compaction. Over-compaction of the wall backfill should be avoided.

The passive pressure at the toe of the retaining wall should not be considered in evaluating resistance to lateral loading unless the backfill at the toe of the wall is properly placed and adequately compacted. Where the toe of the wall is cast directly against undisturbed native soils or properly compacted fill materials, lateral loads may be evaluated in design using passive pressures based on equivalent fluid pressures of the soils. In addition, the retaining wall should be set back from any slopes a sufficient distance to provide a minimum embedment of 2 feet below the lowest adjacent finish grades.

Dynamic lateral earth pressures will need to be considered in the design of retaining walls. A seismic coefficient equal to  $\frac{1}{2}$  of the peak horizontal ground acceleration of 0.30g is used for calculating seismic lateral earth pressure. A simple procedure for determining the lateral force due to an earthquake is to compute the initial static pressure and add to it the increase in pressure from ground motion. For a vertical wall, with horizontal backfill slope, dynamic lateral earth pressures due to seismic loading ( $K_h = 0.15$ ) may be estimated using 6H p.s.f. (rectangular pressure distribution) for both active and at-rest conditions and for level backfill, where H is the height of the wall in feet. The dynamic lateral earth

pressures presented above are in addition to the static lateral earth pressures and act at 0.6 H above the wall base.

Retaining walls should be well drained to reduce the build-up of hydrostatic pressures. If drainage is not used behind the retaining walls, hydraulic pressure should be considered in the design. A typical drainage system would consist of a 1- to 2-foot wide zone of permeable material, such as Mineral Aggregate Type 4 or equivalent, immediately adjacent to the wall with a perforated pipe (perforations down) at the base of the wall discharging to a suitable drainage facility. A filter fabric, such as Mirafi 180N or equivalent, should be placed between the drainage material and the compacted backfill material. As an alternative, a prefabricated geocomposite drainage product, such as MiraDrain or EnkaDrain, may be used instead of the drainage material with filter fabric. The prefabricated drainage product should also be hydraulically connected to a perforated pipe at the base of the wall.

## 7.4 Pavement Sections

New pavements will be required for parking areas for automobiles and equipment. We anticipate that both rigid and flexible pavements may be considered. Critical features that govern the durability of a pavement section include the stability of the subgrade, the presence of moisture and organics, the traffic volume, and the frequency of use by heavy vehicles.

### 7.4.1 Design Recommendations

Based on the soil conditions encountered in our borings, we recommend that an average California bearing ratio (CBR) value of 10 be used for the subgrade soils. This corresponds to an average resilient modulus (MR) value of 15 ksi. For the base course, a resilient modulus (MR) value of 30 ksi may be assumed.

Modulus of subgrade reaction values were evaluated based on AASHTO design methods for rigid pavements with 6-inch and 10-inch thicknesses. The following values were obtained, and may be used for developing alternative pavement sections.

#### 6-inch Rigid Pavement

- Slab on subgrade: Estimated  $k = MR / 19.4 = 773$  pci
- Average composite k value (assuming 6" base course) = 800 pci
- Average relative damage  $ur = 0.076$
- Effective composite k (corrected for relative damage) = 720 pci
- Corrected for Loss of Support (LS = 1.0)  $k = 200$  pci

#### 10-inch Rigid Pavement

- Slab on subgrade: Estimated  $k = MR / 19.4 = 773$  pci
- Average composite k value (assuming 6" base course) = 850 pci
- Average relative damage  $ur = 0.76$
- Effective k (corrected for relative damage) = 780 pci

- Corrected for Loss of Support (LS = 1.0)  $k = 220$  pci

#### 7.4.2 Pavement Section Recommendations

Based on our understanding of the project, the following traffic conditions were assumed for design of relatively light use pavements such as automobile parking and driveways.

- ADT (projected average two-way daily traffic) = 1,000 passenger vehicles
- Analysis Period = 20 years
- 0.02 ESAL/Vehicle

The projected traffic loading for these conditions is 0.07 million ESALs.

The following minimum ACP pavement section is recommended. The recommendations are based on AASHTO design methods.

<b>Table 6</b>	
<b>Recommended ACP Light Vehicle Pavement Section</b>	
<b>Pavement Course</b>	<b>Minimum Thickness</b>
Asphalt Concrete (HMA class ½ inch per WSDOT Standard Spec. 9-03.8(6))	3 inches
Crushed Surfacing Base Course	6 inches

As an alternative, the following PCCP section may be used in these areas.

<b>Table 7</b>	
<b>Recommended PCCP Light Vehicle Pavement Section</b>	
<b>Pavement Course</b>	<b>Minimum Thickness</b>
Portland Cement Concrete (PCC)	6 inches
Crushed Surfacing Base Course	4 inches

For relatively heavy loads, such as for heavy vehicle parking and equipment storage areas, the following PCCP section may be used.

<b>Table 8</b>	
<b>Recommended PCCP Heavy Vehicle Pavement Section</b>	
<b>Pavement Course</b>	<b>Minimum Thickness</b>
Portland Cement Concrete (PCC)	10 inches
Crushed Surfacing Base Course	4 inches

### 7.4.3 Pavement Construction Considerations

Pavement construction and all materials should conform to the specifications and requirements of the Washington Department of Transportation Standard Specifications, latest edition, the U.S. Army Corps of Engineers where applicable, and the following minimum requirements:

- All pavement subgrades should be scarified to a depth of at least 12 inches below finished subgrade elevation, moisture-conditioned to optimum moisture content, and compacted to at least 95 percent relative compaction (based on ASTM:D-1557).
- Subgrade soils should be in a stable, firm, and unyielding condition at the time that the aggregate base rock materials are placed and compacted. This should be documented by proof-rolling the prepared subgrade prior to placing base rock.
- Imported crushed rock, such as “Crushed Surfacing Top Course or Base Course” per WSDOT Standard Specification 9-03.9(3), should be used for the base course.

All base course and any fill placed below the base course, should be placed and compacted to at least 95 percent (based on ASTM:D-1557) to a depth of 2 feet. Fill soils below this 2-foot depth should be compacted to at least 90 percent.

Paved areas should be sloped and drainage gradients maintained to carry all surface water off the site. Surface water ponding should not be allowed anywhere on the site during or after construction. Where concrete curbs are used to isolate landscaping in or adjacent to the pavement areas, it is recommended that the curbs be extended a minimum of 2 inches into the subgrade soil below the base/subbase course aggregate to reduce migration of landscape water into the pavement section. Alternatively, an underdrain system could be constructed to collect excessive water from landscaping irrigation.

## 7.5 Stormwater Infiltration

A new stormwater facility is planned near the southwestern perimeter of the site adjacent to 7<sup>th</sup> Street. Although details of the facility have not yet been finalized, it is anticipated that the facility will infiltrate water at or below the existing ground surface elevation of 224 feet.

Based on textural analysis of the soils encountered in a boring drilled in the proposed stormwater facility area, soils consist of 7 to 8 feet of gravelly sand with trace silt overlying gravel and sand with some silt. Groundwater was not encountered in the boring depth of

10.5 feet. In our opinion, based on the soil and groundwater conditions encountered, infiltration of stormwater appears feasible at this location.

Design infiltration rates may be estimated based on the  $D_{10}$  size (grain diameter in mm corresponding to 10% passing by weight), in accordance with the Pierce County Stormwater Management and Site Development Manual. Based on the soils encountered, a  $D_{10}$  size of 0.37 mm was measured for the gravelly sand in the upper 7.5 feet in our boring, corresponding to a design infiltration rate of 6.5 inches per hour. A  $D_{10}$  size of 0.10 mm was measured for the gravel and sand soils below this depth, corresponding to a design infiltration rate of 2.0 inches per hour. For preliminary design, a maximum infiltration rate of 2.0 inches per hour may be assumed.

Infiltration elevations should be planned a minimum of 3 feet above seasonal high groundwater levels and relatively impermeable layers. No evidence of groundwater or impermeable layers was encountered within the 10.5 feet depth of our boring (above an elevation of 213.5 feet). Therefore, infiltration appears feasible down to an elevation of 216.5 feet. Lower infiltration elevations may be feasible if groundwater elevations lower than 213.5 feet are confirmed with additional borings.

## 7.6 Earthwork Construction Considerations

Although plans have not yet been finalized, it is anticipated that some cuts and/or fills will be required to level the grade in the TEMF building area and surrounding paved areas. Other portions of the site are relatively level and will likely be constructed at or near existing grade, so only minor grading will be necessary.

In general, all grading work should conform to Division 2 of WSDOT's Standard Specifications for Road, Bridge, and Municipal Construction (latest edition) and the site-specific recommendations contained in this report. All materials should meet, and test methods should be performed, in accordance with current WSDOT Standard Specifications, Pierce County Standards, and U.S. Army Corps of Engineers requirements.

We recommend that earthwork be observed by a qualified geotechnical engineer. It is important that the earthwork be observed to evaluate whether any undesirable/unsuitable materials are encountered during the excavation and scarification process, and whether the exposed soil conditions are similar to those encountered in our exploration. The following subsections provide general guidelines for design of site grading and earthwork.

### 7.6.1 Site Preparation

At the on-set of earthwork, the construction areas should be thoroughly cleared and grubbed. All topsoil, vegetation, root balls and other deleterious and unsuitable materials should be removed and disposed of properly to reduce potential contamination of the excavated materials. Alternatively, topsoil may be stockpiled for later reuse in planter areas. Based on the results of our explorations and explorations by others, a stripping depth of roughly 1 to 2 feet will be needed to remove topsoil and root-laden soil across undeveloped portions of the site, although greater depths should be expected locally. For the purpose of this discussion, subgrade level should be considered the bottom of pavement sections.

Any loose, soft, or yielding areas disclosed during the clearing and grubbing operations should be over-excavated to expose firm ground, and the resulting excavation should be backfilled with approved on-site fill material compacted to a minimum of 90 percent relative compaction. Relative compaction refers to the in-place dry density of soil

expressed as a percentage of the maximum dry density as determined by ASTM Test Designation D 1557-91. Prior to placement of the backfill, the over-excavated subgrade should be compacted to a firm and unyielding condition.

Following clearing and grubbing, the subgrades to receive fill should be moisture-conditioned to near optimum moisture and compacted to a stable, firm, unyielding condition. Optimum moisture is the water content (percentage by dry weight) corresponding to the maximum dry density.

Saturation and subsequent yielding of the prepared subgrade due to inclement weather and poor drainage may require removal of the soft areas and replacement with well-compacted engineered fill. In addition, if the subgrade soils are observed to be pumping during compaction, the subgrade should be stabilized prior to fill placement. Subgrade stabilization measures may include replacement of pumping soils with well-graded granular material or the incorporation of ground stabilization fabrics.

### 7.6.2 Excavation and Grading

It is our opinion that the excavations can be accomplished with conventional earth working equipment.

### 7.6.3 Temporary and Permanent Slopes

We anticipate that excavations may be required for construction of structures such as equipment maintenance pits. All excavation sidewalls should be sloped back adequately to provide stability and minimize sloughing and erosion. Stable construction slopes should be the responsibility of the contractor and should be determined during construction. WISHA/OSHA regulations should be followed at all times. For planning purposes, the following maximum slope angles are recommended for the soil types anticipated in the excavations.

<b>Soil Type</b>	<b>Maximum Inclination (Horizontal: Vertical)</b>
Loose sand and gravel	2 H:1 V
Medium dense to dense sand and gravel	1.5 H:1 V

Permanent cut and fill slopes should be designed with a slope ratio of 2H:1V or flatter.

### 7.6.4 Temporary Dewatering Considerations

Due to the depth of the water table, significant seepage is not anticipated in the excavations. Some seepage may occur locally during the wet season due to perched groundwater conditions. An internal system of sumpholes and pumps will likely be adequate to temporarily dewater these excavations during construction.

### **7.6.5 Fill Materials**

Although some soils may be generated in some areas from grading operations, we do not anticipate that significant amounts of soils will be generated for reuse as fill materials. Therefore, the import of fill materials will likely be required. We offer the following recommendations for both on-site and imported materials for planning purposes.

Generally, the on-site granular material, such as gravel and sand, may be reused as a source of fill and backfill materials. It should contain no lumps or fragments greater than 4 inches in maximum dimension. Topsoils and soft silty soils generated from the excavation should not be used as fill and backfill materials and should be disposed of off-site or stockpiled for later use as landscaping fill.

Imported materials should consist of well-graded select granular materials meeting the requirements of 9-03.14(1) as specified in WSDOT's Standard Specifications. Specific recommendations for fill materials used for pavement sections are presented in separate sections of this report. Imported materials should be tested and approved by a qualified testing laboratory prior to hauling to the project site.

### **7.6.6 Fill Placement and Compaction Requirements**

In general, the soils to be used as fill and backfill should be moisture-conditioned to within 3 percent of the optimum moisture, placed in level lifts not exceeding 8 inches in loose thickness, and compacted to a minimum of 90 percent relative compaction (based on ASTM: D-1557). The fill and backfill material within the upper 2 feet below the subgrades for foundations and pavements should be compacted to a minimum of 95 percent relative compaction.

Observations and soil density tests should be performed during grading operations to assist the contractor in obtaining the required degree of compaction and the proper moisture content on each fill lift. Where compaction is less than required, additional compactive effort should be applied with adjustment of moisture content as necessary, to obtain the specified compaction.

### **7.6.7 Wet Weather Construction**

We recommend that all fill pads be sloped to promote the rapid run-off of precipitation and to prevent ponding of water. No soil should be left uncompacted and exposed to moisture.

It is recommend that any grading activity be performed during the drier summer and early fall months; however, most of the on-site soils have a low fines content. It is our opinion that the portions of the soils with low fines content may be used for grading activities during the winter months, provided that they are segregated from the silty, near-surface soils. The exposed subgrade areas and any stockpiles of fill materials should be covered with plastic sheets to prevent saturation and sloughing of soils.

## **7.7 Design Review**

Preliminary and final drawings and specifications for the proposed construction should be forwarded to CivilTech Engineering for review. This review is necessary to evaluate the adherence of the plans and specifications to the intent of the recommendations provided herein.

## 8.0 Limitations

This report has been prepared for the exclusive use of Frankfurt-Short-Bruza Associates, P.C., their clients, and other project consultants for specific application to the proposed Joint Base Lewis-McChord, Brigade Complex TEMF project in accordance with generally accepted geotechnical engineering principles and practices. No other warranty, expressed or implied, is made.

The analyses and recommendations submitted in this report are based, in part, upon the subsurface information obtained from borings. The boring logs indicate subsurface conditions only at the specific locations and at the time of drilling. Variations of subsoil conditions may occur between boring locations and with the passage of time. The nature and extent of these variations may not become evident until construction is underway. If variations then appear evident, it will be necessary to reevaluate the recommendations provided in this report.

Respectfully submitted,  
CIVILTECH ENGINEERING

**Mark A. Wicklund, P.E.**  
Geotechnical Engineer

**Dustin C. Ong, P.E.**  
President

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## 9.0 References

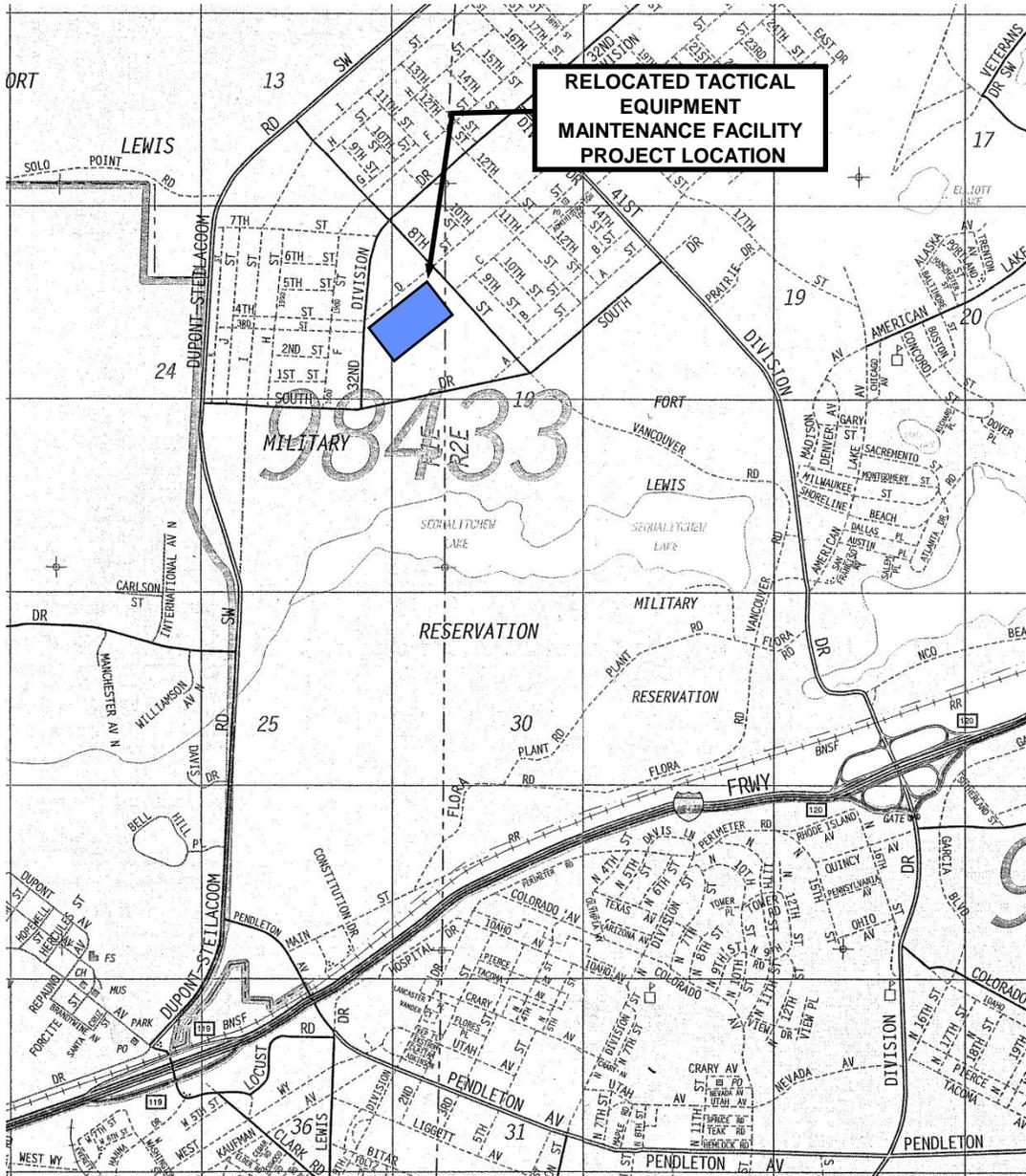
1. Walsh, T.J., 1987, Geologic Map of the South Half of the Tacoma Quadrangle, Washington: Washington Division of Geology and Earth Resources, Open File Report 87-3.
2. Washington State Department of Transportation and American Public Works Association (WSDOT and APWA), Standard Specifications for Road, Bridge, and Municipal Construction

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## 10.0 Appendices

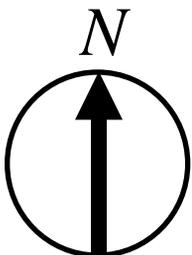
# APPENDIX A

## Figures



**RELOCATED TACTICAL  
EQUIPMENT  
MAINTENANCE FACILITY  
PROJECT LOCATION**

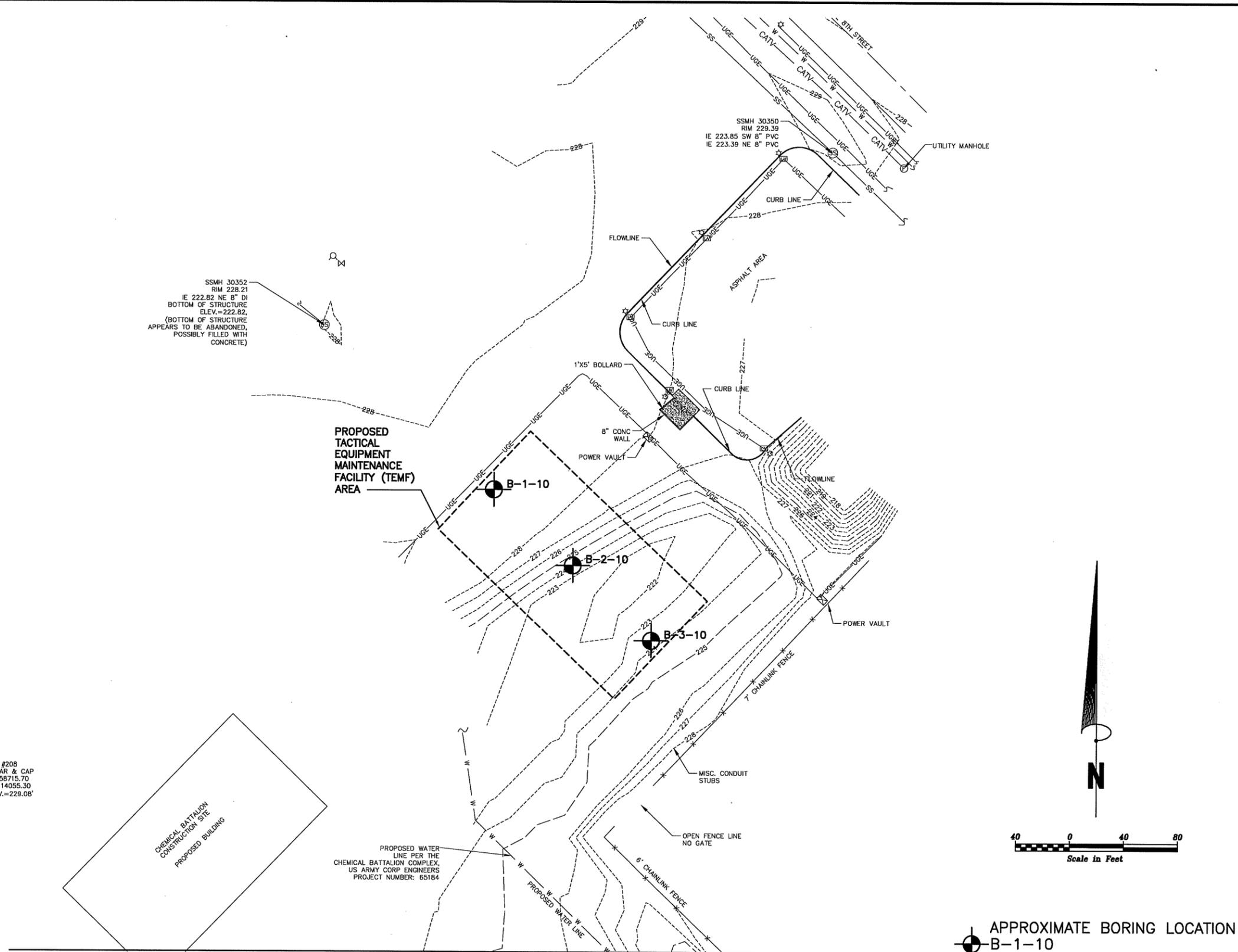
98433



**VICINITY MAP**  
Monday, August 09, 2010  
**BRIGADE COMPLEX TEMP MODIFICATION**  
**JOINT BASE LEWIS-McCHORD, WA**

**JOB NO.**  
28021-1A  
**SHT. NO.**  
FIGURE 1

Path: F:\Geotech\2008\28021 - Ft Lewis Brigade Complex & WIT (F99)\28021-01A - Jt Base Lewis McChord TEMF Relocation\Cad\Draw Filename: FIGRUE 2a Plot date: May 24, 2010-10:12:47am Xref Filename: | BORDER |



MATCH LINE SEE FIGURE 2b

DESIGNED BY  
**M. WICKLUND**

DRAWN BY  
**J. ROBERTS**

DATE  
**5/20/10**



10800 NE 8th Street Suite 820  
Bellevue, WA 98004  
Phone: 425.453.6488  
Fax: 425.453.5848

JOB NO.  
28021-01A

SITE AND EXPLORATION PLAN

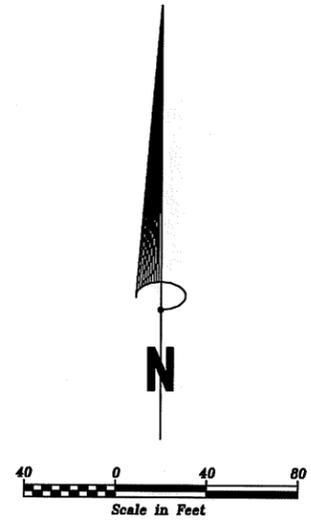
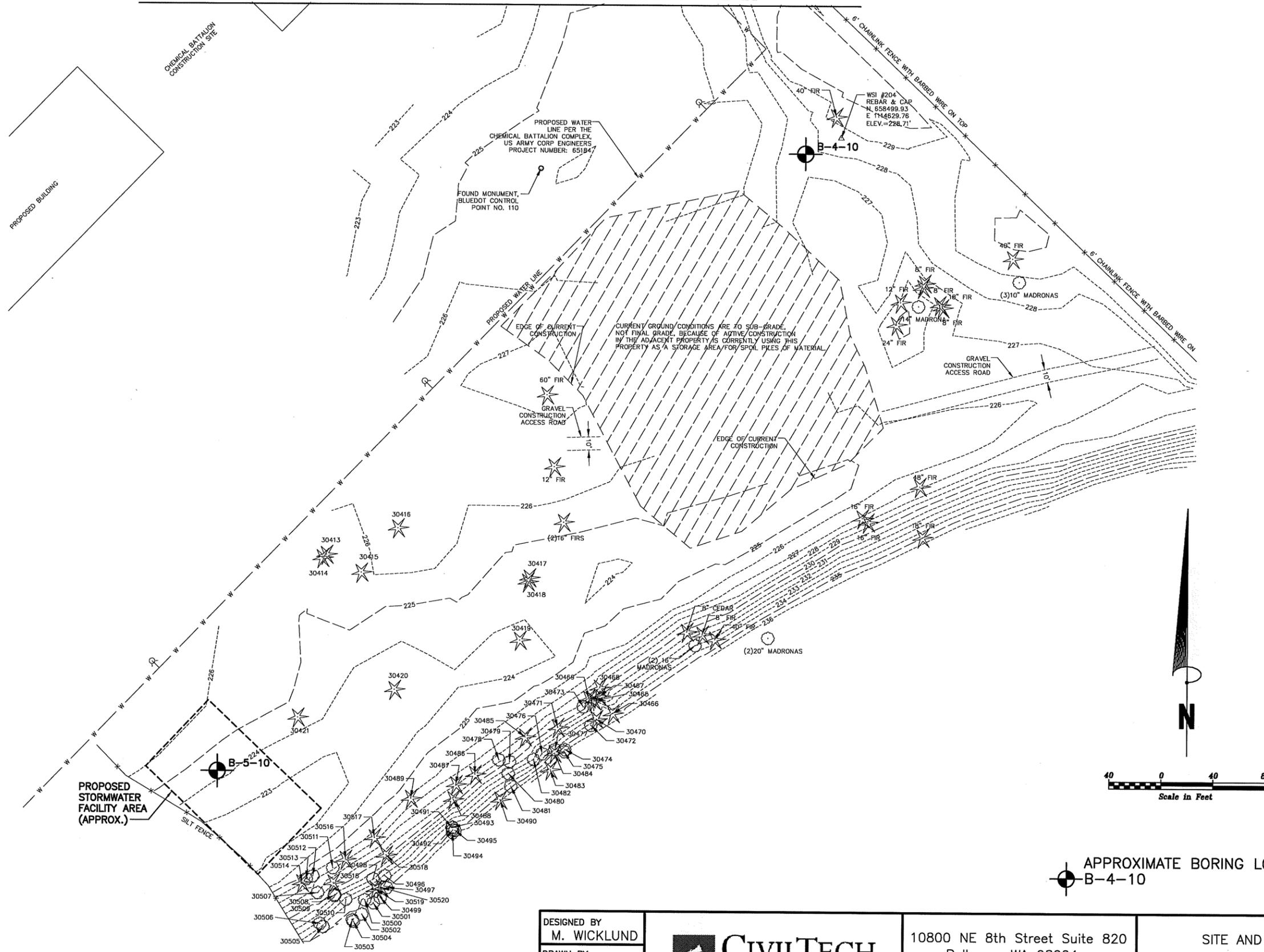
BRIGADE COMPLEX TEMF MODIFICATION  
JOINT BASE LEWIS-MCCHORD, WA

SHEET NO.  
**FIGURE 2a**

Monday, August 09, 2010

Path: P:\Geotech\2008\28021 - Ft Lewis Brigade Complex & WIT (FSB)\28021-01A - Jt Base Lewis McChord TEMF Relocation\Cad\Draw Filename: FIGURE 2b Plot date: May 24, 2010-10:13:59am Xref Filename: | BORDER |

MATCH LINE SEE FIGURE 2a



APPROXIMATE BORING LOCATION  
B-4-10

DESIGNED BY  
**M. WICKLUND**

DRAWN BY  
**J. ROBERTS**

DATE  
**5/20/10**



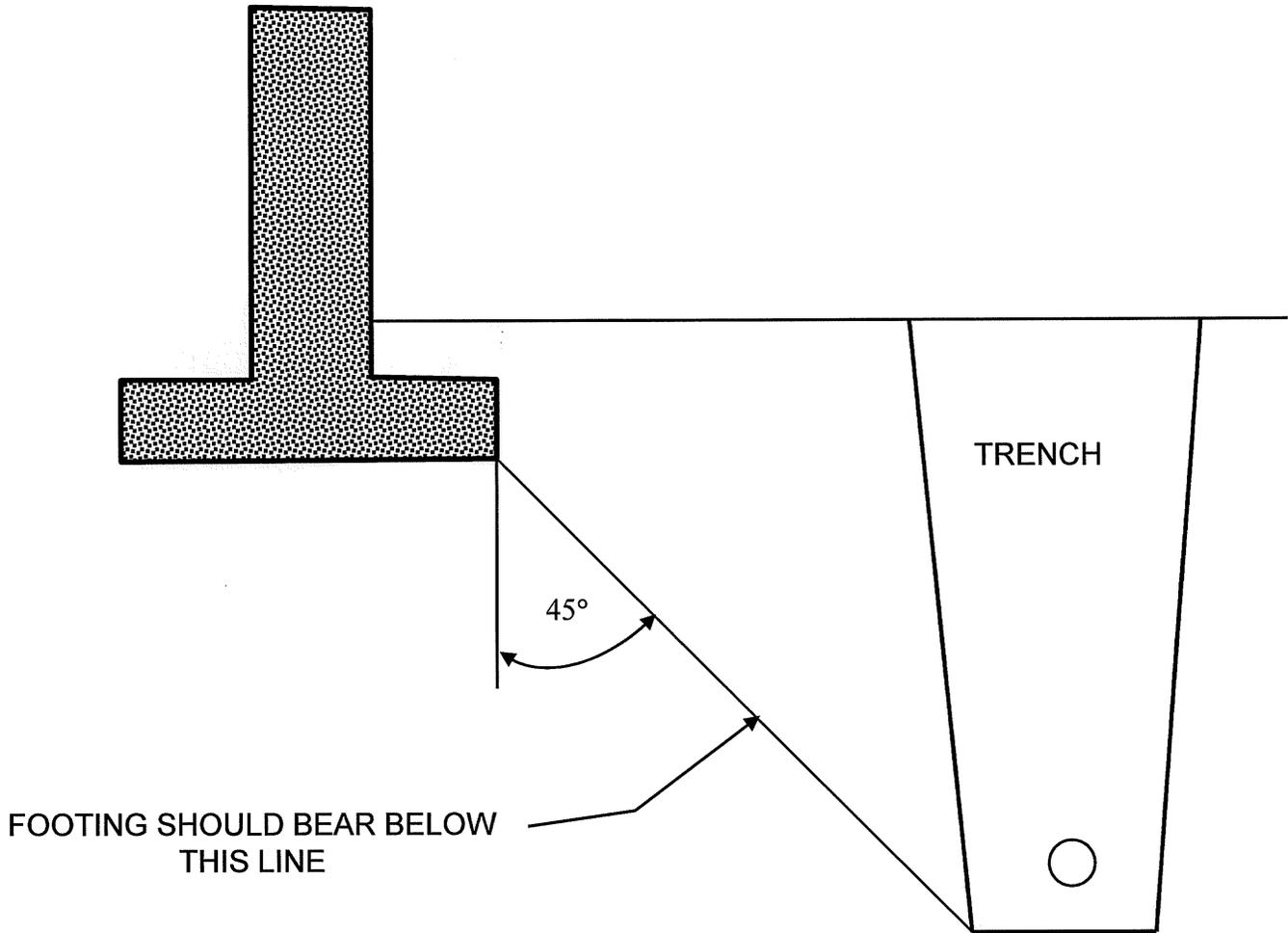
10800 NE 8th Street Suite 820  
Bellevue, WA 98004  
Phone: 425.453.6488  
Fax: 425.453.5848

SITE AND EXPLORATION PLAN

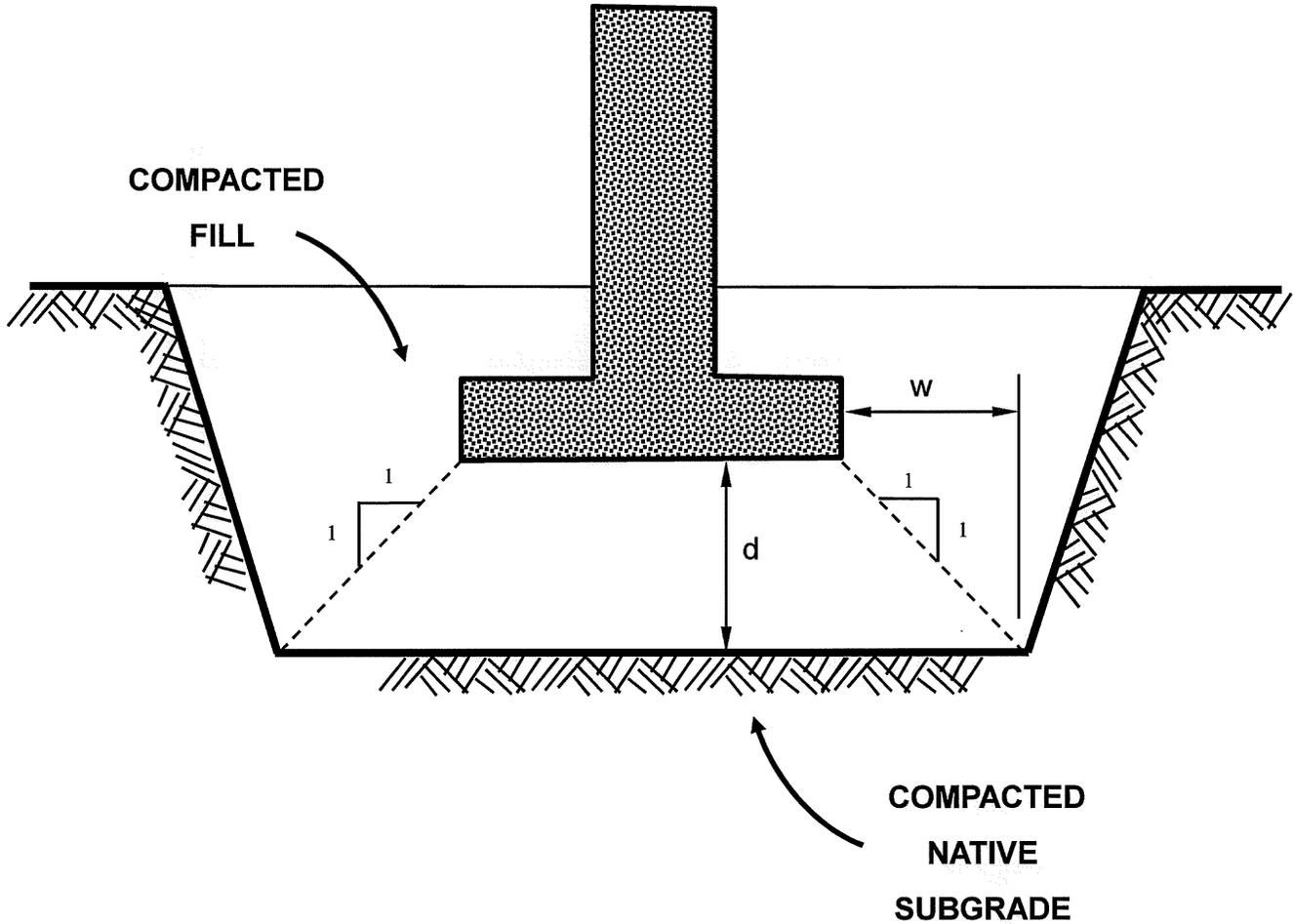
BRIGADE COMPLEX TEMF MODIFICATION  
JOINT BASE LEWIS-MCCHORD, WA

JOB NO.  
28021-01A

SHEET NO.  
**FIGURE 2b**



**Typical Detail For Footing  
Embedment Near Trench**



d	Minimum overexcavation depth below footing
w = d	Minimum overexcavation width outside of footing
<b>Refer to Text for Design Parameters</b>	

**Typical Detail For  
Overexcavation/Compaction  
Beneath Footing**

## **APPENDIX B**

### **Field Exploration by CivilTech**

## **APPENDIX B - FIELD EXPLORATION BY CIVILTECH**

The subsurface conditions at the site were explored by drilling and sampling five borings. The borings were advanced to depths ranging from 5.5 to 15.5 feet below the existing ground surface. The approximate locations of these explorations are shown on the Site Exploration Plans in Appendix A, Figures 2a and 2b.

Drilling was completed on May 3, 2010, using a truck-mounted rig equipped with hollow stem augers by Cascade Drilling, Woodinville, WA, under subcontract to CivilTech. The borings were backfilled with bentonite chips after completion of drilling.

Soil samples were obtained from the drilled borings in accordance with ASTM Standard Method D 1586-84, Penetration Test and Split-Barrel Sampling of Soils, by driving a 2-inch O.D. standard split-spoon sampler with a 140-pound hammer free-falling 30 inches. The blow counts needed to advance the sampler the last 12 inches of an 18-inch drive are shown on the boring logs at the approximate sample depths.

The materials encountered in the borings were classified by visual and textural examination in the field by our engineer, who monitored the drilling operation on a near-continuous basis and classified the soils in general accordance with ASTM Standard Practice D-2488-84, Description and Identification of Soils (Visual-Manual Procedure). These classifications were further reviewed visually and by testing in the laboratory. Graphic presentations of the materials encountered are provided on the logs of borings Plates B-1 through B-5. The key to the symbols and notations is shown on Plates B-6 and B-7.

# B-1-10

## Joint Base Lewis McChord Brigade Complex TEMF Mod.

Contract # W912DW-08-D-1014-0002

Drill Rig: HS Auger  
 Sampling: SPT  
 Logged By: MW  
 Total Depth: 15.5 feet  
 Driller/Foreman: Cascade/S. Choat

Date Started: 5-3-10  
 Date Completed: 5-3-10  
 Elevation: 228' (Approx.)  
 Groundwater: Not Encountered

Date: 5/24/2010  
 File: P:\Geotech\2008128021 - Ft Lewis Brigade Complex & WIT (FSB)\28021-01A - Jt Base Lewis McChord TEMF Relocation\Logs\28021-01A.log  
 SuperLog CivilTech Software, USA www.civiltech.com

Description	Graphic Log	Depth	Sample Type	SPT Blowcount (N-Value)	MC (%)	Remarks
Surface: Sod over GRAVEL And Sand		0				
Medium dense, moist, brownish to tan gray, GRAVEL And Sand (GW/SW) with trace to some silt, non-plastic (Recessional Outwash)				8-13-12 (25)	7.2	pH/R/S = 6.02/320 k/10
				13-14-12 (26)	4.3	4.3% fines, see sieve anal.
			5	5-9-14 (23)	5.2	pH/R = 6.80/300 k
Becomes dense, gray			10	10-10-24 (34)	4.1	pH/R = 6.14/ 380 k
Boring completed at depth of 15.5 feet		15	10-20-29 (49)			
		20				
		25				
		30				
		35				

UNITS:  
 R (Resistivity): ohm cm  
 S (Sulfate): mg/kg



# B-2-10

## Joint Base Lewis McChord Brigade Complex TEMF Mod.

Contract # W912DW-08-D-1014-0002

Drill Rig: HS Auger  
Sampling: SPT  
Logged By: MW  
Total Depth: 15.5 feet  
Driller/Foreman: Cascade/S. Choat

Date Started: 5-3-10  
Date Completed: 5-3-10  
Elevation: 224' (Approx.)  
Groundwater: 13.5' BGS ATD (Approx.)

Description	Graphic Log	Depth	Sample Type	SPT Blowcount (N-Value)	MC (%)	Remarks	
Surface: Sod over Topsoil		0					
Medium dense, moist, dark brown, silty, gravelly organic SAND, non-plastic (Topsoil Fill)				12-10-10 (20)			
Medium dense to very dense, moist, gray, GRAVEL And Sand (GW/SW) with trace silt, non-plastic			5		11-12-17 (29) 14-33-33 (66)	13.2 5.0	pH/R/S = 6.17/430 k/9.2 8.6% fines, see sieve anal. pH/R = 6.33/440 k
			10		16-50/6" (50/6")	6.7	pH/R = 6.94/350 k
Becomes wet			15		50/3" (50/3")		
Boring completed at depth of 15.5 feet		15.5					

UNITS:  
R (Resistivity): ohm cm  
S (Sulfate): mg/kg



SuperLog CivilTech Software, USA www.civiltech.com File: P:\Geotech\2008\28021 - Ft Lewis Brigade Complex & WIT (FSB)\28021-01A - Jt Base Lewis McChord TEMF Relocation\Logs\28021-01A.log Date: 5/24/2010

# B-3-10

## Joint Base Lewis McChord Brigade Complex TEMF Mod.

Contract # W912DW-08-D-1014-0002

Drill Rig: HS Auger

Sampling: SPT

Logged By: MW

Total Depth: 15.5 feet

Driller/Foreman: Cascade/S. Choat

Date Started: 5-3-10

Date Completed: 5-3-10

Elevation: 223' (Approx.)

Groundwater: 13.0' BGS ATD (Approx.)

Description	Graphic Log	Depth	Sample Type	SPT Blowcount (N-Value)	MC (%)	Remarks
Surface: Sod over Topsoil		0				
Medium dense, moist, dark brown, silty, gravelly organic SAND, non-plastic (Topsoil Fill)				13-30-30 (60)	19.0	pH/R/S = 5.63/410 k/8.9
Very dense, moist, gray, GRAVEL And Sand (GW/SW) with trace to some silt, non-plastic				19-50/5" (50/5")	6.0	pH/R = 6.15/370 k 5.5% fines, see sieve anal.
		5		16-24-26 (50)	10.0	pH/R = 6.25/360 k
		10		(50/5" (50/5")		
Becomes wet and silty						
		15		23-50/3" (50/3")		
Boring completed at depth of 15.5 feet						
		20				
		25				
		30				
		35				

UNITS:  
R (Resistivity): ohm cm  
S (Sulfate): mg/kg



File: P:\Geotech\2008\28021 - Ft Lewis Brigade Complex & WIT (FSB)\28021-01A - Jt Base Lewis McChord TEMF Relocation\Logs\28021-01A.log Date: 5/24/2010  
 SuperLog CivilTech Software, USA www.civiltech.com

# B-4-10

## Joint Base Lewis McChord Brigade Complex TEMF Mod.

Contract # W912DW-08-D-1014-0002

Drill Rig: HS Auger

Sampling: SPT

Logged By: MW

Total Depth: 5.5 feet

Driller/Foreman: Cascade/S. Choat

Date Started: 5-3-10

Date Completed: 5-3-10

Elevation: 228'

Groundwater: Not Encountered

Description

Graphic Log

Depth

Sample Type

SPT Blowcount (N-Value)

MC (%)

Remarks

Dense, moist, gray, GRAVEL And Sand (GW/SW) with trace to some silt, non-plastic



GWT not encountered

16-39-46  
(85)

21-24-20  
(44)

15-17-24  
(41)

Rock in shoe - Blowcount Overstated

Dense, moist, gray, gravelly SAND (SW) with trace silt, non-plastic

Boring completed at depth of 5.5 feet

UNITS:

R (Resistivity): ohm cm

S (Sulfate): mg/kg



Date: 5/24/2010  
 File: P:\Geotech\2008\28021 - Ft Lewis Brigade Complex & WIT (FSB)\28021-01A - Jt Base Lewis McChord TEMF Relocation\Logs\28021-01A.log  
 SuperLog CivilTech Software, USA www.civiltech.com

# B-5-10

## Joint Base Lewis McChord Brigade Complex TEMF Mod.

Contract # W912DW-08-D-1014-0002

Drill Rig: HS Auger  
Sampling: SPT  
Logged By: MW  
Total Depth: 5.5 feet  
Driller/Foreman: Cascade/S. Choat

Date Started: 5-3-10  
Date Completed: 5-3-10  
Elevation: 224'  
Groundwater: Not Encountered

Date: 5/24/2010  
File: P:\Geotech\2008\28021 - Ft Lewis Brigade Complex & WIT (FSB)\28021-01A - Jt Base Lewis McChord TEMF Relocation\Logs\28021-01A.log  
SuperLog CivilTech Software, USA www.civiltech.com

Description	Graphic Log	Depth	Sample Type	SPT Blowcount (N-Value)	MC (%)	Remarks
Medium dense, moist, gray, gravelly Sand (SP) with trace to some silt, non-plastic		0 5 10				
				15-10-10 (20)		No Recovery
				6-6-9 (15)		2.4% fines, see sieve analysis
Very dense, moist, tan-gray, GRAVEL Ane Sand (GW/SW) with some silt, non-plastic		10				
				33-50/3"		8.9% fines, see sieve analysis
Boring completed at depth of 10.5 feet		15 20 25 30 35				

UNITS:  
R (Resistivity): ohm cm  
S (Sulfate): mg/kg



**KEY:**

- Indicates 3-inch OD Dames & Moore Sample.
- ▣ Indicates 2-inch OD Split Spoon Sample (SPT).
- ⊠ Indicates Disturbed Sample.
- I Indicates No Recovery.
- Indicates Bag Sample.
- ◻ Indicates Shelby Tube Sample.

**COMPONENT DEFINITIONS**

COMPONENT	SIZE RANGE
Boulders	Larger than 12 in
Cobbles	3 in to 12 in
Gravel	3 in to No 4 (4.5mm)
Coarse gravel	3 in to 3/4 in
Fine gravel	3/4 in to No 4 (4.5mm)
Sand	No. 4 (4.5mm) to No. 200 (0.074mm)
Coarse sand	No. 4 (4.5 mm) to No. 10 (2.0 mm)
Medium sand	No. 10 (2.0 mm) to No. 40 (0.42 mm)
Fine sand	No. 40 (0.42 mm) to No. 200 (0.074 mm)
Silt and Clay	Smaller than No. 200 (0.074 mm)

**COMPONENT PROPORTIONS**

DESCRIPTIVE TERMS	RANGE OF PROPORTION
Trace or little	1 - 5%
Some	5 - 12%
Clayey, silty, sandy, gravelly	12 - 30%
And	30 - 50%

**MOISTURE CONTENT**

DRY	Absence of moisture, dusty, dry to the touch.
DAMP	Some perceptible moisture; below optimum
MOIST	No visible water; near optimum moisture content
WET	Visible free water, usually soil is below water table.

**ATD:** At Time of Drilling

**BGS:** Below Ground Surface

**RELATIVE DENSITY OR CONSISTENCY VERSUS SPT N -VALUE**

COHESIONLESS SOILS			COHESIVE SOILS		
Density	N (blows/ft)	Approximate Relative Density (%)	Consistency	N (blows/ft)	Approximate Undrained Shear Strength (psf)
Very Loose	0 to 4	0 - 15	Very Soft	0 to 2	< 250
Loose	4 to 10	16 - 35	Soft	2 to 4	250 - 500
Medium Dense	10 to 30	36 - 65	Medium Stiff	4 to 8	501 - 1000
Dense	30 to 50	66 - 85	Stiff	8 to 15	1001 - 2000
Very Dense	over 50	86 - 100	Very Stiff	15 to 30	2001 - 4000
			Hard	over 30	> 4000

MAJOR DIVISION			GRAPHIC SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS	
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	
				GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES	
				GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES	
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	CLEAN SAND (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	
				SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	
	MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND-SILT MIXTURES	
				SC	CLAYEY SANDS, SAND-CLAY MIXTURES	
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY	
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	
	MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
					CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
					OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS	

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

### UNIFIED SOIL CLASSIFICATION SYSTEM

# **APPENDIX C**

## **Laboratory Tests**

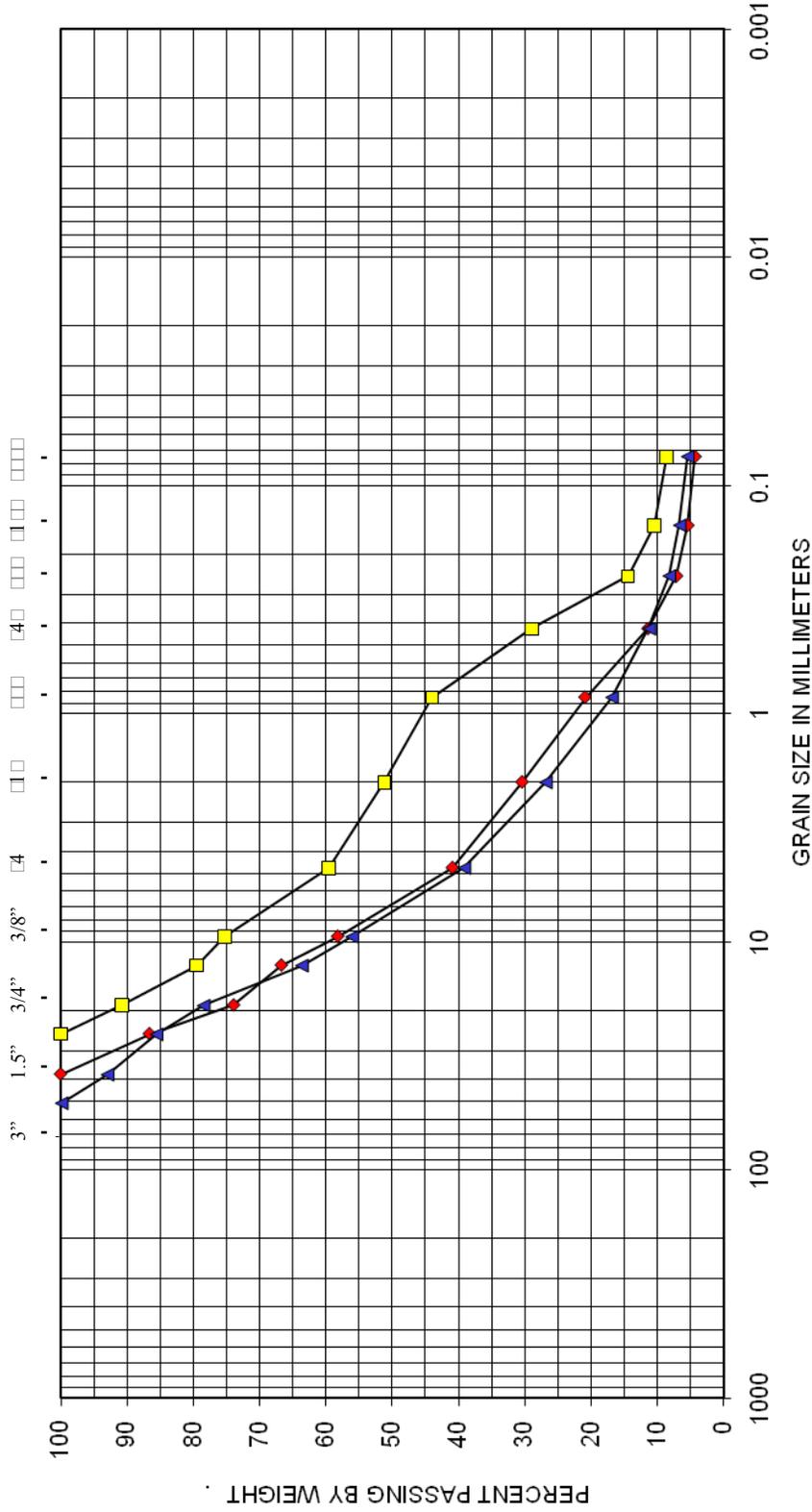
**APPENDIX C – LABORATORY TESTS**

Our laboratory testing program included evaluations of moisture content and sieve analysis.

Moisture content (ASTM D 2216) determinations were performed on selected soil samples as an aid in the classification and evaluation of soil properties. The results of these tests are presented on the Logs of Borings at the appropriate sample depths.

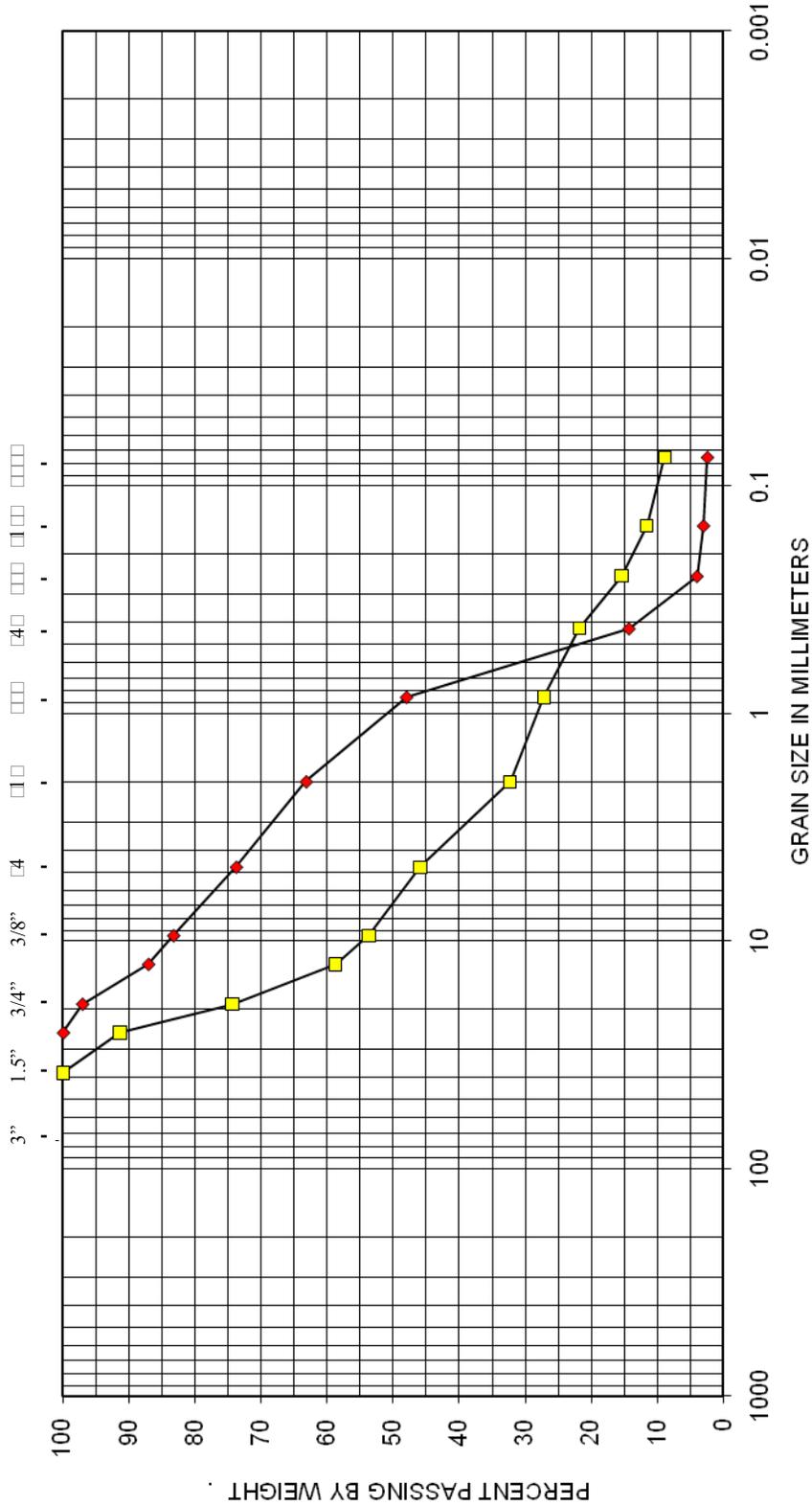
Five sieve analysis tests (ASTM C 136) were performed on selected soil samples to evaluate the gradation characteristics of the soils and to aid in soil classification. Results of the tests are presented on Plates C-1 and C-2.

U.S. STANDARD SIEVE SIZE

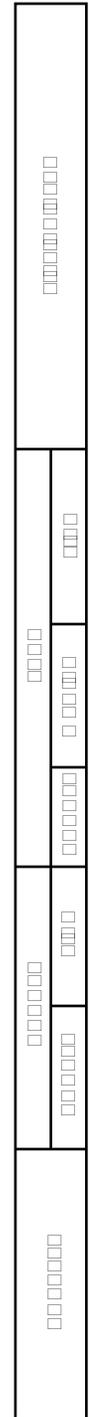




U.S. STANDARD SIEVE SIZE



Section:



SYMBOL	EXPLORATION NUMBER	DEPTH (ft)	SOIL CLASSIFICATION
			Gray, gravelly sand with trace silt (SP) Tan-gray, gravel and sand with some silt (GW/SW)



SIEVE ANALYSIS RESULTS

Brigade Complex TEMF Modification,  
Joint Base Lewis McChord #28021-01A

---

REQUEST FOR PROPOSAL W912DW-09-T-5400

**864<sup>TH</sup> ENGINEERING BATTALION SMALL TACTICAL  
EQUIPMENT MAINTENANCE FACILITIES (TEMF)**

**PN 069167, FY 2009**

JOINT BASE LEWIS-McCHORD, WASHINGTON

Appendix B: List of Drawings

**APPENDIX B**  
**LIST OF DRAWINGS**

CONCEPTUAL SITE UTILITY PLAN (APPENDIX C)

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
CU101	CONCEPTUAL SITE UTILITY PLAN
ES101	CONCEPTUAL SITE ELECTRICAL PLAN

CONCEPTUAL SITE LAYOUT PLANS (APPENDIX J)

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
G-001	COVER SHEET & SHEET INDEX
C-003	LEGEND & PROJECT LOCATION MAP
CD101	CONCEPTUAL SITE DEMOLITION PLAN
CS101	CONCEPTUAL SITE LAYOUT PLAN
CU101	CONCEPTUAL SITE UTILITY PLAN
ES101	CONCEPTUAL SITE ELECTRICAL PLAN

PRELIMINARY TOPOGRAPHIC SURVEY (APPENDIX J)

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
G-001 1/3	TITLE AND AREA MAPS
G-002 2/3	TITLE AND AREA MAPS
G-003 3/3	TITLE AND AREA MAPS

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REQUEST FOR PROPOSAL W912DW-09-T-5400

**864<sup>TH</sup> ENGINEERING BRIGADE, TACTICAL EQUIPMENT  
MAINTENANCE FACILITIES, TEMF**

**PN 069167, FY 2009**

FORT LEWIS, WASHINGTON

Appendix C: Utility Connections

Revised: Amendment #1 dated 08/06/10

- Communications connection for the 864<sup>th</sup> Battalion Small TEMF at Joint Base Lewis-McChord
- Conceptual Site Electrical Plan Sheet ES101



**Frankfurt-Short-Bruza** Architects Engineers Planners

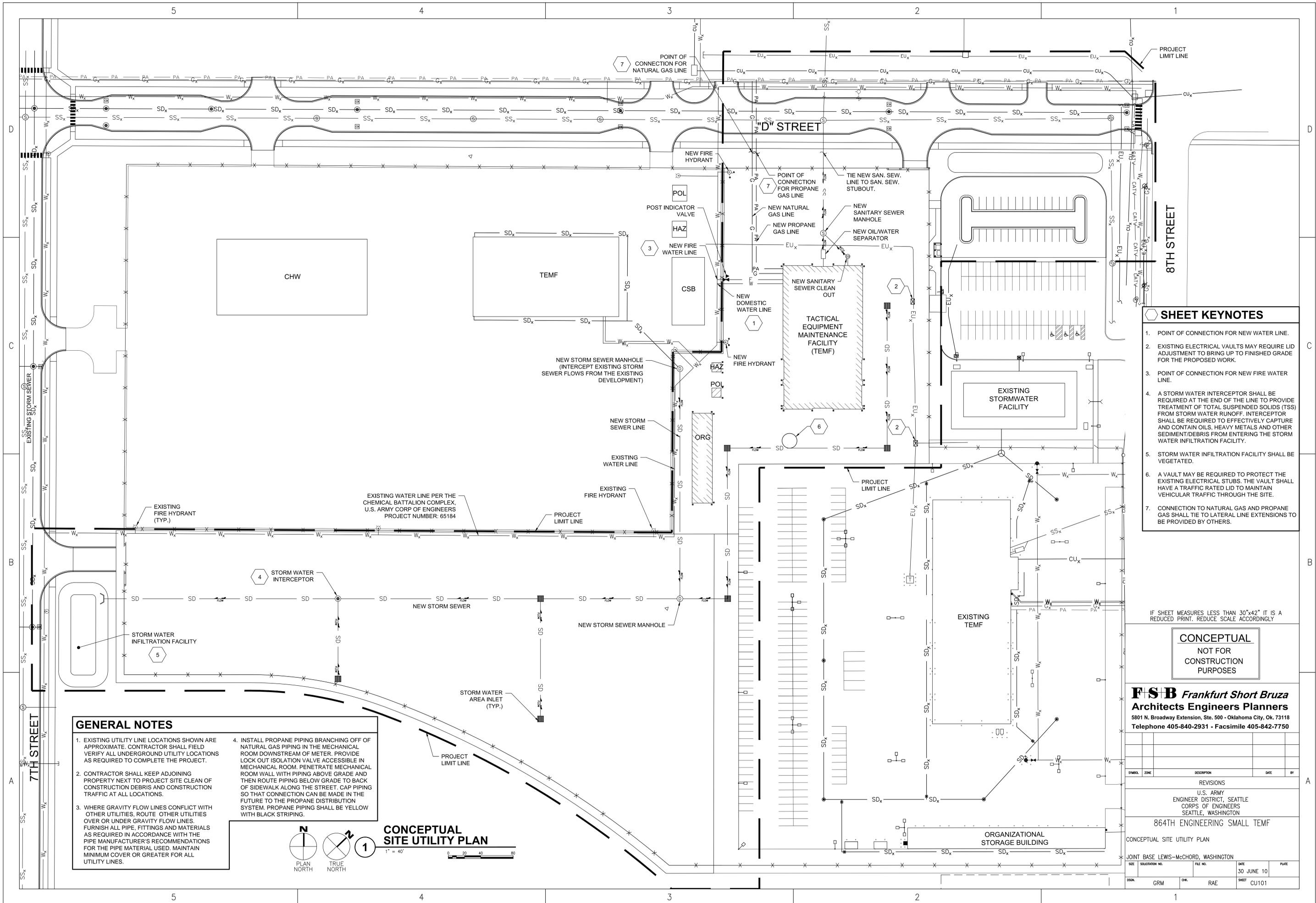
Medium Voltage connection for the 864<sup>th</sup> Engineering Battalion Small TEMF at Joint Base Lewis-McChord:

The following work items are to be provided and installed by the Design Build contractor. The Medium Voltage power connection for the TEMF will originate in an existing man hole (Vault 3). The existing 3 way Medium Voltage junction will be utilized. Install new Medium Voltage cabling from Vault 3 to Vault 2 in the existing duct bank. A new 3-way Medium Voltage junction will be installed in Vault 2. A new 2-way concrete encased duct bank will be installed from Vault 2 (currently the existing conduits are stubbed out of Vault 2 approximately 10 feet, connect to these conduit stub outs) to the location of the new pad mount transformer to serve the new facility (transformer size to be determined by the DB contractor). Provide an additional conduit stub out of the transformer vault. All new cabling to be copper with concentric neutral the minimum conductor size for Medium Voltage cabling shall be #2. All duct banks shall be concrete encased.

Communications connection for the 864<sup>th</sup> Engineering Battalion Small TEMF at Joint Base Lewis-McChord:

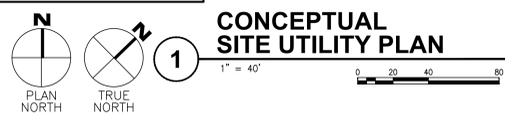
**-Revised : Amendment #1 date 08/06/10**

The connection points for both fiber optic cabling and copper cabling are identified in the RFP drawings. The Design Build Contractor will install a new six way duct bank from the identified tie point to a new telecommunications vault adjacent to the site. From the new telecommunications vault the DB contractor will install a new three way duct bank to the telecommunications tie-in point at the facility. One conduit in each section of the duct banks will have a 9 cell inner duct system all other conduit will have a pull rope installed. The facility requires a minimum of 50 pair copper cable and a 12 strand fiber optic cable. Contractor shall coordinate with JBLM NEC for telecommunications tie-in requirements. The communications design shall be in accordance with the current edition of the I3A design guide. All duct banks shall be concrete encased.



- SHEET KEYNOTES**
- POINT OF CONNECTION FOR NEW WATER LINE.
  - EXISTING ELECTRICAL VAULTS MAY REQUIRE LID ADJUSTMENT TO BRING UP TO FINISHED GRADE FOR THE PROPOSED WORK.
  - POINT OF CONNECTION FOR NEW FIRE WATER LINE.
  - A STORM WATER INTERCEPTOR SHALL BE REQUIRED AT THE END OF THE LINE TO PROVIDE TREATMENT OF TOTAL SUSPENDED SOLIDS (TSS) FROM STORM WATER RUNOFF. INTERCEPTOR SHALL BE REQUIRED TO EFFECTIVELY CAPTURE AND CONTAIN OILS, HEAVY METALS AND OTHER SEDIMENT/DEBRIS FROM ENTERING THE STORM WATER INFILTRATION FACILITY.
  - STORM WATER INFILTRATION FACILITY SHALL BE VEGETATED.
  - A VAULT MAY BE REQUIRED TO PROTECT THE EXISTING ELECTRICAL STUBS. THE VAULT SHALL HAVE A TRAFFIC RATED LID TO MAINTAIN VEHICULAR TRAFFIC THROUGH THE SITE.
  - CONNECTION TO NATURAL GAS AND PROPANE GAS SHALL TIE TO LATERAL LINE EXTENSIONS TO BE PROVIDED BY OTHERS.

- GENERAL NOTES**
- EXISTING UTILITY LINE LOCATIONS SHOWN ARE APPROXIMATE. CONTRACTOR SHALL FIELD VERIFY ALL UNDERGROUND UTILITY LOCATIONS AS REQUIRED TO COMPLETE THE PROJECT.
  - CONTRACTOR SHALL KEEP ADJOINING PROPERTY NEXT TO PROJECT SITE CLEAN OF CONSTRUCTION DEBRIS AND CONSTRUCTION TRAFFIC AT ALL LOCATIONS.
  - WHERE GRAVITY FLOW LINES CONFLICT WITH OTHER UTILITIES, ROUTE OTHER UTILITIES OVER OR UNDER GRAVITY FLOW LINES. FURNISH ALL PIPE, FITTINGS AND MATERIALS AS REQUIRED IN ACCORDANCE WITH THE PIPE MANUFACTURER'S RECOMMENDATIONS FOR THE PIPE MATERIAL USED. MAINTAIN MINIMUM COVER OR GREATER FOR ALL UTILITY LINES.
  - INSTALL PROPANE PIPING BRANCHING OFF OF NATURAL GAS PIPING IN THE MECHANICAL ROOM DOWNSTREAM OF METER. PROVIDE LOCK OUT ISOLATION VALVE ACCESSIBLE IN MECHANICAL ROOM. PENETRATE MECHANICAL ROOM WALL WITH PIPING ABOVE GRADE AND THEN ROUTE PIPING BELOW GRADE TO BACK OF SIDEWALK ALONG THE STREET. CAP PIPING SO THAT CONNECTION CAN BE MADE IN THE FUTURE TO THE PROPANE DISTRIBUTION SYSTEM. PROPANE PIPING SHALL BE YELLOW WITH BLACK STRIPING.



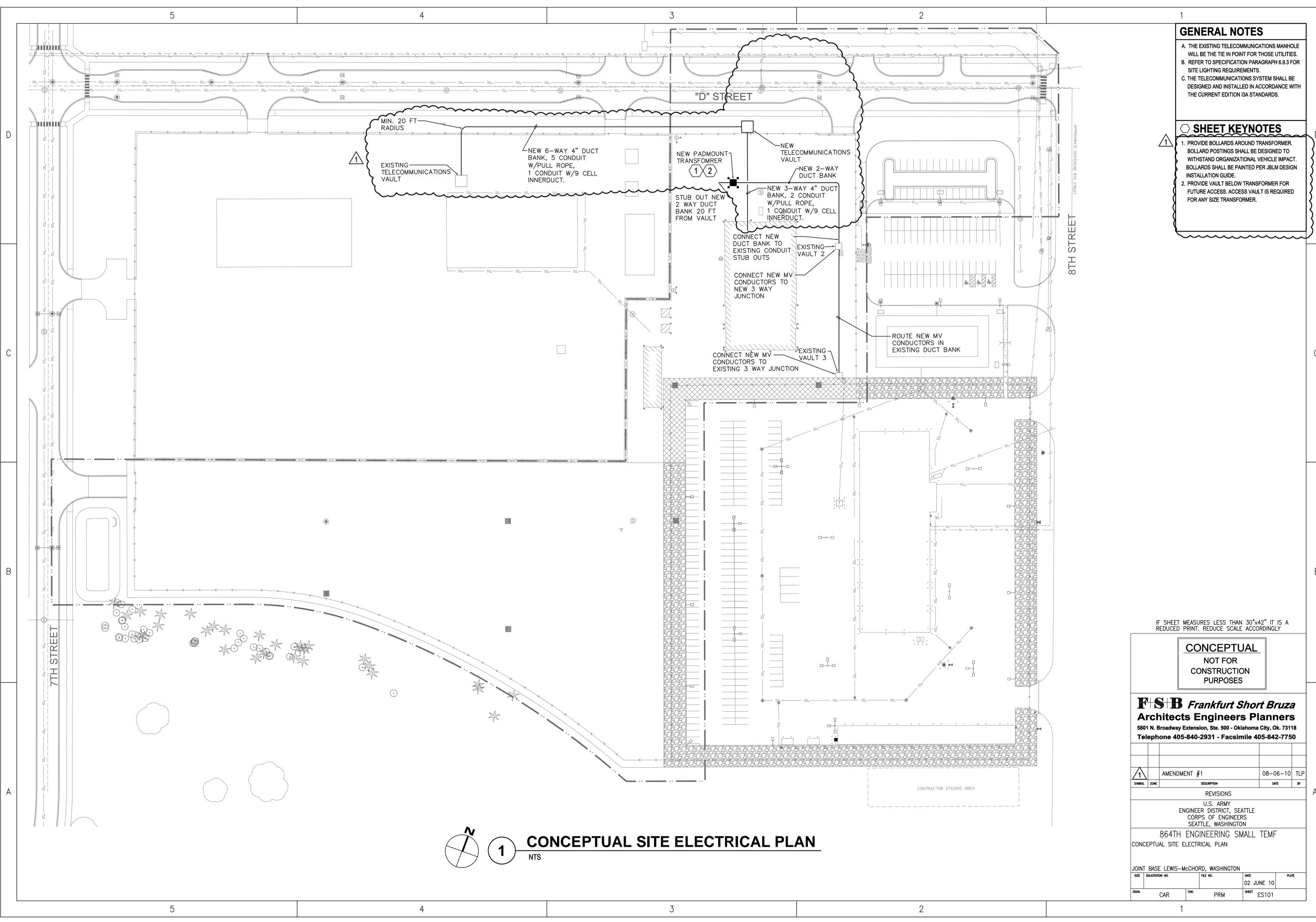
**CONCEPTUAL SITE UTILITY PLAN**

IF SHEET MEASURES LESS THAN 30"x42" IT IS A REDUCED PRINT. REDUCE SCALE ACCORDINGLY

**CONCEPTUAL NOT FOR CONSTRUCTION PURPOSES**

**F S B Frankfurt Short Bruza Architects Engineers Planners**  
 5801 N. Broadway Extension, Ste. 500 - Oklahoma City, Ok. 73118  
 Telephone 405-840-2931 - Facsimile 405-842-7750

SYMBOL	ZONE	DESCRIPTION	DATE	BY
REVISIONS				
U.S. ARMY ENGINEER DISTRICT, SEATTLE CORPS OF ENGINEERS SEATTLE, WASHINGTON				
864TH ENGINEERING SMALL TEMF				
CONCEPTUAL SITE UTILITY PLAN				
JOINT BASE LEWIS-McCHORD, WASHINGTON				
SIZE	SOLUTION NO.	FILE NO.	DATE	PLATE
			30 JUNE 10	
DESIGN	GRM	CHK. RAE	SHEET CU101	



- GENERAL NOTES**
- A. THE EXISTING TELECOMMUNICATIONS MANHOLE WILL BE THE TIE IN POINT FOR THOSE UTILITIES.
  - B. REFER TO SPECIFICATION PARAGRAPH 6.9.3 FOR SITE LIGHTING REQUIREMENTS.
  - C. THE TELECOMMUNICATIONS SYSTEM SHALL BE DESIGNED AND INSTALLED IN ACCORDANCE WITH THE CURRENT EDITION ISA STANDARDS.
- SHEET KEYNOTES**
- 1. PROVIDE BOLLARDS AROUND TRANSFORMER. BOLLARD POSTINGS SHALL BE DESIGNED TO WITHSTAND ORGANIZATIONAL VEHICLE IMPACT. BOLLARDS SHALL BE PAINTED PER JBLM DESIGN INSTALLATION GUIDE.
  - 2. PROVIDE VAULT BELOW TRANSFORMER FOR FUTURE ACCESS. ACCESS VAULT IS REQUIRED FOR ANY SIZE TRANSFORMER.

IF SHEET MEASURES LESS THAN 30"x42" IT IS A REDUCED PRINT. REDUCE SCALE ACCORDINGLY

**CONCEPTUAL**  
NOT FOR  
CONSTRUCTION  
PURPOSES

**F+S+B Frankfurt Short Bruza**  
Architects Engineers Planners  
5801 N. Broadway Extension, Ste. 500 - Oklahoma City, Ok. 73118  
Telephone 405-840-2931 - Facsimile 405-842-7750

1	AMENDMENT #1	08-06-10	TLP
SYMBOL	ZONE	DESCRIPTION	DATE

REVISIONS  
U.S. ARMY  
ENGINEER DISTRICT, SEATTLE  
CORPS OF ENGINEERS  
SEATTLE, WASHINGTON

864TH ENGINEERING SMALL TEMP  
CONCEPTUAL SITE ELECTRICAL PLAN

JOINT BASE LEWIS-McCHORD, WASHINGTON				
SIZE	SOLUTION NO.	FILE NO.	DATE	PLATE
OSGN.	CAR	CHK.	PRM	SHEET ES101

 **1** **CONCEPTUAL SITE ELECTRICAL PLAN**  
NTS

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REQUEST FOR PROPOSAL W912DW-09-T-5400

**864<sup>th</sup> ENGINEERING BATTALION SMALL TACTICAL  
EQUIPMENT MAINTENANCE FACILITIES (TEMF)  
PN 069167, FY 2009**

JOINT BASE LEWIS-McCHORD, WASHINGTON

Appendix D: FIRE FLOW TEST RESULTS

### Fire Flow Test Hydrants

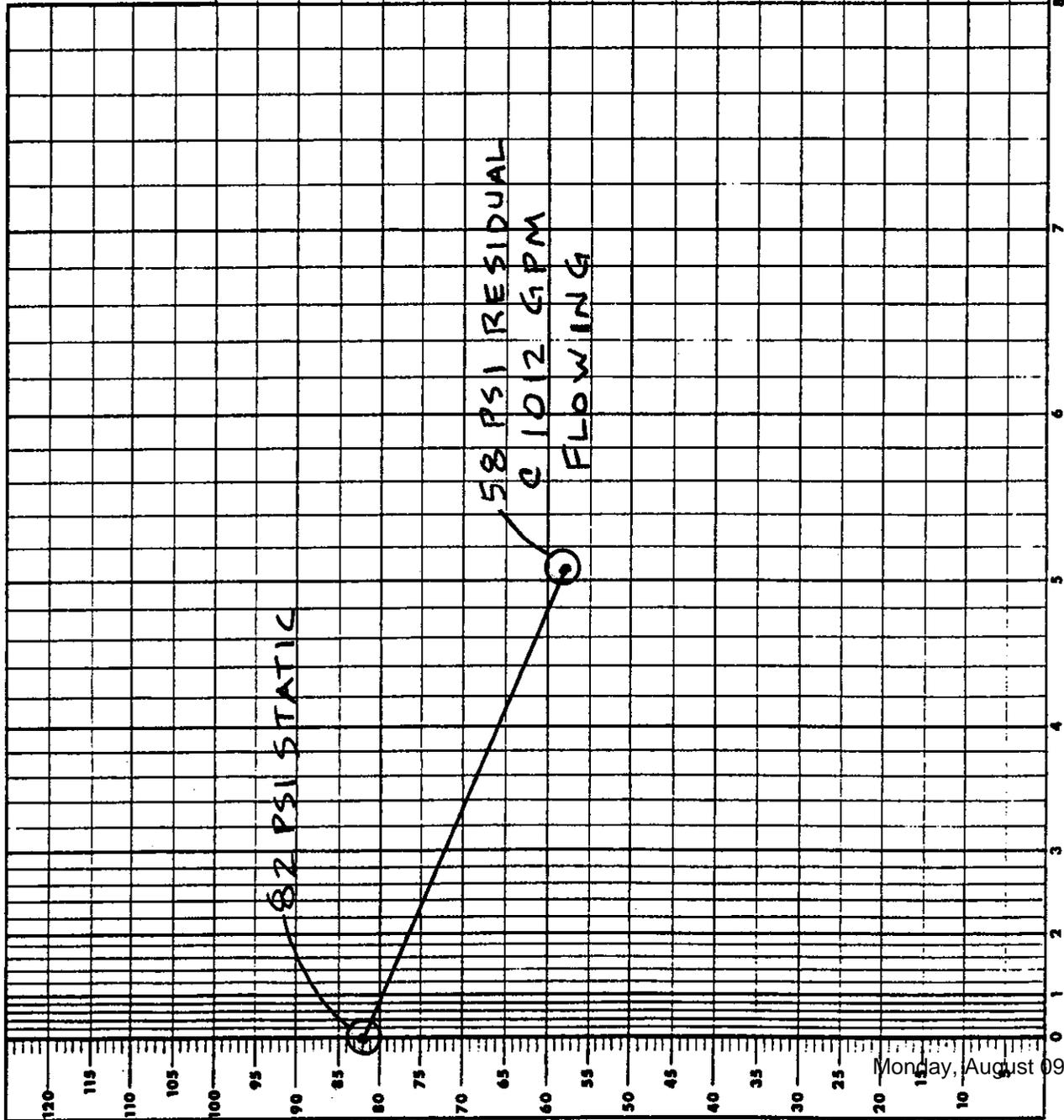


JOB NAME FY09 BRIGADE COMPLEX JOB NO. \_\_\_\_\_ DATE 5/19/2010

LOCATION FORT LEWIS, WA REPORT BY RELIANCE FIRE PROTECTION

WATER DATA:

STATIC	<u>82</u>	PSI
RESIDUAL	<u>58</u>	PSI
FLOW	<u>1012</u>	GPM



FLOW - GPM (8 x 200)

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REQUEST FOR PROPOSAL W912DW-09-T-5400

**864<sup>TH</sup> ENGINEERING BATTALION SMALL TACTICAL  
EQUIPMENT MAINTENANCE FACILITIES (TEMF)**

**PN 069167, FY 2009**

JOINT BASE LEWIS-McCHORD, WASHINGTON

Appendix E: Environmental Information

<b>Record of Environmental Consideration (REC)</b>	NEPA #: 10-047/CM Planning #: PN 69167/G. Stedman
--	--

**1. Description of Proposed Action**

The proposed action is to construct a small, standard design tactical equipment maintenance shop (TEMF) for the 864<sup>th</sup> Engineers as well as pave a storage area and equipment parking area with gravel. Originally, project number (PN) 69167 was for the construction of an entire expeditionary sustainment command (ESC) brigade complex. However, the ESC brigade was stationed elsewhere, so the funding associated with the original project was reallocated to other purposes at new locations on post. One of the reallocations of those funds was for the 864<sup>th</sup> Engineering Battalion's small TEMF, which will be adjacent to their existing motorpool (see ES figure 1). The need for these further facilities and space was not recognized by the 864<sup>th</sup> until after the original environmental documentation was completed for the first motorpool facility and hardstand more than two years ago.

**2. Proposed Date(s) of Action:** This is a FY09 project.

**3. "Environmental Survey" Summary of Findings**

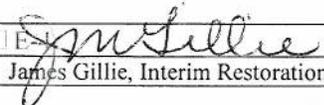
SWMU 52-1 to the south of the project site, both former fire fighting training sites, and AOC 8-5 pose no risk to the human or natural environment as was determined by the FLAO-RI Report and do not require any further remedial action. AOC 8-4, however, continues its remediation in the form of active monitoring. The land use control restricting drinking water well installation which overlaps the site's southeast corner, should not affect the project, given that the scope of this project does not include the installation of any drinking water wells. The Former B Range, which is inclusive of this project's site, encompasses all of JBLM-North cantonment and UXO awareness is required for all ground disturbing activities within that area until an official LUC can be designed and implemented for that area. No previous or current contamination issues discussed in the Environmental Survey, except for the possibility of finding UXO, should have any effect on the proposed project.

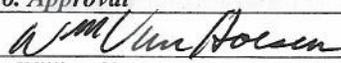
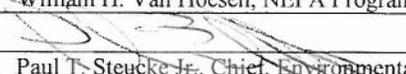
**4. Categorical Exclusion or covered in an existing EA/EIS.**

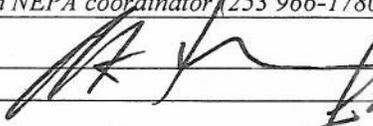
Project is categorically excluded, having no significant individual or cumulative environmental impacts, under title 32 CFR Part 651, Appendix B. Cat Ex: *Construction exclusion (c)(1) "...new construction on a previously undisturbed site if the area to be disturbed has no more than 5.0 cumulative acres of new surface disturbance ..."* and there are no extraordinary circumstances regarding the proposed project.

The area proposed for use in this project has been previously disturbed and much of it is currently being used as construction lay-down yards and other types of support space for the many other adjacent construction projects. Based on the large amount of construction that is going on all around this site it is difficult to determine this project's site from other projects. Approximately, 95% of the land bounded by 32<sup>nd</sup> Division Dr. and 8<sup>th</sup> St on the west and east, and D St to the north has been leveled and construction is ongoing for one project or another.

<b>5. Compliance Screening</b>			
<b>a. Endangered Species, Fish &amp; Wildlife, Wetlands</b>			
Tab J insert:	<input type="checkbox"/> T-1	<input type="checkbox"/> T-2	<input type="checkbox"/> T-3
	<i>Dave Clouse</i>		<i>14 July 2010</i>
	Dave Clouse, Fish & Wildlife Program Manager		date
<b>b. NAGPRA, NHPA, &amp; AIRFA</b>			
Tab J insert:	<input checked="" type="checkbox"/> C-1	<input type="checkbox"/> C-2	
	<i>Dr. Bret Ruby</i>		<i>PA Exemption General 6. 19 July 2010</i>
	Dr. Bret Ruby, Cultural Resources Program Manager		date
<b>c. Clean Water</b>			
Tab J insert:	<input checked="" type="checkbox"/> W-1	<input checked="" type="checkbox"/> W-2	<input type="checkbox"/> W-3
	<i>Joe Gibbens</i>		<i>7/3/10</i>
	Joe Gibbens, Water Program Manager		date
<b>d. Clean Air</b>			
Tab J insert:	<input type="checkbox"/> A-1	<input type="checkbox"/> A-2	<input checked="" type="checkbox"/> A-3
	<i>Tom Olsen</i>		<i>18 July 10</i>
	Tom Olsen, Air Program Manager		date
<b>e. P2 &amp; Hazardous Materials</b>			
Tab J insert:	<input checked="" type="checkbox"/> P-1	<input checked="" type="checkbox"/> P-2	<input checked="" type="checkbox"/> P-3
	<i>Terry Austin</i>		<i>7/14/10</i>
	Terry Austin, Hazardous Materials Program Manager		date
<b>f. RCRA-C &amp; RCRA-D</b>			
Tab J insert:	<input checked="" type="checkbox"/> R-1	<input type="checkbox"/> R-2	
	<i>Ken Smith</i>		<i>7/14/10</i>
	Ken Smith, Solid & Hazardous Waste Program Manager		date

<b>g. Environmental Restoration Program</b>			
Tab J insert:	<input type="checkbox"/> E-1	<input type="checkbox"/> E-2	<input checked="" type="checkbox"/> E-3
	 James Gillie, Interim Restoration Task Lead		7/13/10 date

<b>6. Approval</b>			
a. Environmental Evaluator	 William H. Van Hoesen, NEPA Program Manager		19 JUL 10 date
b. Staff Concurrence	 Paul T. Steucke Jr., Chief, Environmental Division		14 JUL 10 date

<b>7. Proponent/Project Officer</b>			
Caveat with this NEPA document: Any change in the magnitude, location, duration, or timing of this project will require re-evaluation and possible revised documentation by the proponent with the Public Works, Environmental Division NEPA coordinator (253 966-1780).			
		<b>RANDALL W. HANNA</b> Deputy Director of Public Works	21 July phone/date
Mr. Steven T. Perrenot, P.E./ Director of Public Works, JBLM			

<b>Document History</b>			
07-060a Record of Environmental Consideration (REC) and Environmental Survey (ES); completed 27 Oct 08. PN 69167			
07-057 Record of Environmental Consideration (REC) and Environmental Survey (ES); completed 13 Sept 07. PN 68842			

<i>Provisions</i>
<b>Clean Air</b>
<b>A-4: Radon</b> Radon mitigation techniques will be incorporated in construction plans to prevent excessive radon migration into new structures (per AR 420-1, H-24). Contact the Air program for assistance at (253) 966-1776.
<b>NAGPRA, NHPA, AIRFA</b>
<b>C-1: Inadvertent Discovery</b> In the event that human remains, artifacts, or features of archaeological interest are inadvertently discovered, the contractor shall immediately cease activity in the vicinity of the discovery, stabilize and protect such discoveries from further disturbance or public disclosure, and provide immediate notice (within 24 hours following discovery) by telephone and email to the Installation Cultural Resource Manager and Contracting Officer's Representative. Work may not proceed in the vicinity of the discovery until authorized to proceed by the Installation Cultural Resource Manager and the Contracting Officer's Representative. The installation Cultural Resource Manager's phone number is (253) 966-1785, or if not available, try (253) 966-1769 or 966-1781. The manager's email is "bret.ruby@us.army.mil".
<b>Environmental Restoration Program</b>
<b>E-3: North Fort/B Range</b> The Military Munitions Response Program (MMRP) site known as the former B Range encompasses JBLM - North. Stokes Mortars have been encountered during construction activities on JBLM - North that may be related to historic B Range usage. The JBLM MMRP has selected a land use control remedy to provide ordnance awareness during construction activities on JBLM-North. Therefore, contractor project managers shall obtain a copy of the pamphlet entitled "Construction Industry 3Rs Explosives Safety Guide" when obtaining digging permits from the Public Works Environmental Division (POC Stacey Kempf, (253) 966-1771, Bldg. 2012, Rm. 312, stacey.kempf@us.army.mil) and distribute to construction workers during intrusive activities.
<b>Pollution Prevention, EPCRA, Sustainability</b>
<b>P-1: Facilities utilizing POL</b> Project design should ensure that: <ol style="list-style-type: none"> <li>1. POL tanks are in secondary containment via double-wall construction or placed within a secondary containment structure.</li> <li>2. POL lines will not be run below grade in pits or under floors of maintenance facilities; they will be run overhead.</li> <li>3. POL lines should connect with bulk tanks to deliver fresh product directly to maintenance bays.</li> <li>4. Bulk tanks for products with large quantity throughput are more cost effective and can be hooked into an air operated delivery system.</li> <li>5. Recovery of waste product should be accomplished through the use of fluid collection caddies that connect to air operated pumps that deliver waste product directly to recycling collection tanks.</li> <li>6. There is no overriding reason to include maintenance or inspection pits in maintenance facilities – undercarriage inspection can be carried out via ramps or lifts.</li> </ol> Primary POC is Terry Austin at (253) 966-6463.
<b>P-2: Materials Procurement</b> Ensure that materials to be used comply with all federal green procurement (GP) laws, including the following: Resource Conservation and Recovery Act (Section 6002), Farm Security and Rural Investment Act of 2002 (Section 9002), Energy Policy Act of 2005 (Section 104), Energy Independence and Security Act of 2007 (Sections 523-526), Executive Order 13423, Executive Order 13514, and Part 23 of the Federal Acquisition Regulation. The GP program mandates the use of environmentally preferable products. Primary POC is Ben Sadoris at (253) 966-6466.
<b>P-3: Hazardous Materials</b> A complete listing of all hazardous materials to be used on this project and their appropriate MSDS' and unit(s) of issue must be submitted to and authorized for use by the Pollution Prevention Program prior to the NTP. A hazardous materials inventory noting quantities of each in-use hazardous material used during the project must be submitted at the end of the project and at the end of each calendar year preceding it. Hazardous materials stored on JBLM must be reported on an inventory by the 15th day following the end of each calendar year quarter. Hazardous material inventories must be submitted using HFL (JBLM) Form 953. POC for HM submittals is Ms. Lois Leiding, (253) 966-6469.

**RCRA-C & RCRA-D**

**R-1:** Public Works, Environmental Division (PW/ED) Recycling Program does have alternative options for the management of construction and/or demolition excess and waste materials. General guidance is as follows:

- 1) The program does accept timber slash, stumps and land clearing debris at the Earthworks (aka Landfill #5). The program also accepts waste concrete and asphalt (C&A) at the Earthworks (segregated and broken to 2 foot by 2 foot size). We prefer the C&A to be crushed (1-1/4" minus) and the woody debris chipped prior to acceptance at the Earthworks. Crushed or chipped materials may also be stockpiled as directed by the recycling manager at satellite locations on the installation, but unprocessed materials may be brought to the Earthworks.
- 2) Clean excavated soils from construction and/or demolition projects may be used to reclaim borrow source pits at JBLM. Borrow Source Use and Entry Notification forms should be filled out and submitted to PW/ED for review and approval. Upon approval, a representative of the program will meet with the COE PM and the contractor at the chosen borrow source pit site to finalize the soil placement plan. Notification forms are available from the Solid Waste and Recycling program manager or at Earthworks (contact information listed below).
- 3) The Earthworks and the Gray Army Airfield stockpile sites have a limited quantity of recycled C&A material that has been crushed to a 1-1/4 " minus specification that is available for JBLM construction projects. Please contact the Solid Waste and Recycling Program Manager or the Earthworks to determine the availability of recycled C&A.
- 4) It is no longer an allowable practice to use JBLM borrow pits for the purpose of placing any type of debris in them, or for the purpose of excavating virgin soil. All use of borrow pits must first gain approval from the recycling program manager.

The Solid Waste and Recycling Program Manager, phone: (253) 966-6452, cell:(253) 377-1420, fax: (253) 966-4985, bldg 2012, rm. 308, or the Earthworks POC at (253) 967-3803, will answer any questions regarding construction or demolition practices involving the need for fill materials, the disposition of waste materials, or issuance of recycled C&A products.

**R-2:** The Contractor shall identify any process waste generated as part of this SOW (or RFP). The procedure's cradle-to-grave processing of waste streams is as follows. The contractor shall:

- Coordinate with Public Works Environmental Services to determine required sampling and analysis protocols for any waste streams (incorrect sampling/analysis may be avoided).
- Provide Environmental Services the process waste analysis results for disposal type determination.
- Upon receipt of waste disposal type determination, identify and submit proposed waste disposal locations/vendors for government approval.
- Provide Environmental Services the receiving facility's waste profile(s) and Hazardous Waste Manifest for review and approval.
- For all hazardous waste leaving Joint Base Lewis-McChord (JBLM), only JBLM Environmental Services designated personnel are authorized to sign Hazardous Waste Manifests.

A minimum of 5 working days is required for receiving facility profile, reviewing the manifest and approval of all hazardous waste shipments. The contractor should anticipate ongoing coordination with ED for review, approval and signature of documents pertaining to the management of their waste streams.

**Clean Water****W-1: Stormwater Pollution Prevention (22 June 2009)**

Any construction activity that will, or is part of a "common plan" of development or sale that will, disturb one or more acres and has the potential to have a discharge of stormwater to a water of the United States either directly or through a conveyance, must obtain the EPA's NPDES General Permit for stormwater discharges from construction activities prior to land disturbing activities. Coverage can be obtained by submitting a Notice of Intent (NOI) to the Environmental Protection Agency (EPA). Additional information can be found at the EPA's website at: <http://cfpub.epa.gov/npdes/stormwater/const.cfm>

In addition, two copies of a project specific Stormwater Pollution Prevention Plan (SWPPP) must be submitted to JBLM Stormwater Office. The SWPPP must be in accordance with the EPA's NPDES General Permit for stormwater discharges from construction activities. One SWPPP copy will be retained by the JBLM Stormwater Compliance Office. The SWPPP must receive approval from the Stormwater Compliance Office prior to the initiation of land disturbing activities. An erosion control plan shall not be substituted for a SWPPP when permit coverage is required. Primary POC can be contacted at (253) 966-1795 and alternate at (253) 967-2837.

**W-2: National Pollutant Discharge Elimination System (22 June 2009)**

Coverage under the EPA's NPDES General Permit for Stormwater Discharges from Construction Activities is not required if all of the stormwater from the construction activity is captured on-site and allowed to evaporate, soak into the ground on-site, or is used for irrigation. A project specific Stormwater Pollution Prevention Plan is not required for projects that do not require permit coverage, however an erosion control plan may still be required under the terms of the Environmental Protection Plan (EPP). Exclusion of permit coverage does not relieve the Contractor of responsibility to protect water resources to the maximum extent practicable, or to maintain compliance with applicable water quality standards. If at anytime during construction stormwater is discharged a Notice of Intent must be submitted to the EPA and all requirements of the Construction General Permit for stormwater discharges will apply. In addition, the JBLM Stormwater Compliance Office must be notified immediately. Primary POC can be contacted at (253) 966-1795 and alternate at (253) 967-2837.

**W-3: Stormwater Underground Injection (22 June 2009)**

Projects that intend to use underground injection control for stormwater management must meet the requirements of Chapter 173-218 WAC, Underground Injection Control Program. Completed registrations forms shall be submitted to the JBLM Stormwater Office for registration with the Washington State Department of Ecology prior to any UIC facilities being constructed. Registration forms and further information can be obtained by contacting the JBLM Stormwater Office, building 2012, room 323. Primary POC can be contacted at (253) 966-1795 and alternate at (253) 967-2837.

**W-4: Stormwater Techniques**

Stormwater management techniques for new development and redevelopment projects shall be designed and constructed in accordance with the most recent version of the Washington State Department of Ecology's Stormwater Management Manual for Western Washington. Stormwater management techniques applied in accordance with the Manual should result in compliance with existing regulatory requirements for stormwater. However, no permits, sampling or any other project specific documentation should be submitted to WADOE. Where the Manual refers to submitting to WADOE, contact the JBLM PW POC for clarification. Use of Low Impact Development techniques is preferred. Primary JBLM PW POC can be contacted at (253) 966-1795 and alternate at (253) 967-2837.

**Environmental Survey (ES)**NEPA #:10-047/CM  
Planning Project: 69167/G. Stedman**1. Proposed Action**

The proposed action is to construct a small, standard design tactical equipment maintenance facility (TEMF) for the 864<sup>th</sup> Engineers as well as pave a storage area and equipment parking area with gravel. Originally, project number (PN) 69167 was for the construction of an entire expeditionary sustainment command (ESC) brigade complex. However, the ESC brigade was stationed elsewhere, so the funding associated with the original project was reallocated to other purposes at new locations on Joint Base Lewis-McChord North (JBLM-North). One of the reallocations of those funds was for the 864<sup>th</sup> Engineering Battalion's small TEMF and associated hardstand, which will be adjacent to their existing motorpool (see figure 1). The need for these further facilities and space was not recognized by the 864<sup>th</sup> until after the original environmental documentation was completed for the first motorpool facility more than two years ago.

**2. Dates of the action**

FY 2009

**3. Contamination Assessment Information Sources:**

- a. Review of the Environmental Baseline Survey (EBS) for Fort Lewis produced by ENSR, February 2001.
- b. Review of the Fort Lewis<sup>1</sup> Environmental Restoration Program/Compliance Clean-up (ERP/CC) Overview Map produced by Public Works GIS team, July 2008, in conjunction with the Fort Lewis Agreed Order Remedial Investigation (FLAO-RI) report, February 2008.
- c. Review of the GIS database for any environmental conflicts/concerns.
- d. Site visit performed by Carol McAdams, Versar Inc., on 9 July 2010.

**4. Statement of Findings**

- a. The EBS disclosed a former fire fighting training area (AOC 15-1) to the southwest of this project's location.
- b. The ERP/CC Map concurred with the findings of the EBS and also disclosed five other potential contamination issues in proximity to the proposed project site.
  - Solid waste management unit (SWMU 52-1) south of the project site is an area where soil testing was performed for certain contaminants and the limits for those contaminants were exceeded.
  - A second former fire fighting training area, Area of Concern (AOC 15-2), was identified and subsequent soil sampling/testing was performed to determine if any form of clean-up was necessary.
  - AOC 8-5; During the removal of this above ground storage tank (AST) contaminated soil was found due to the tank having leaked sometime in the past. Clean closure was achieved by over excavating the site.
  - AOC 8-4; During the tank removal process in 1996 a diesel AST, northeast of the project site, was discovered to have leaked into the ground. Clean closure was not achieved and this area continues to undergo monitoring via multiple monitoring wells.
  - The cantonment area of JBLM-North is the Former B Range where unexploded ordnance has been uncovered during construction activities in the past.
- c. The GIS database confirmed the findings of the EBS and the ERP/CC Map, with no new or different findings than those addressed above.
- d. The site visit revealed no new and/or different findings than those addressed above.

**5. Summary of Findings**

SWMU 52-1 to the south of the project site, both former fire fighting training sites, and AOC 8-5 pose no risk to the human or natural environment as was determined by the FLAO-RI Report and do not require any further remedial action. However, remediation continues at AOC 8-4 via active monitoring wells. The land use control restricting drinking water well installation which overlaps the site's southeast corner, should not affect the project, given that the scope of this project does not include the installation of any drinking water wells. The Former B Range, which is inclusive of this project's site, encompasses all of JBLM-North cantonment and contractor UXO awareness is required for all ground disturbing activities within that area until an official LUC can be designed and implemented for that area. No previous or current contamination issues discussed in the ES, except for the possibility of finding UXO, should have any effect on the proposed project.

<sup>1</sup> This document contains references to "Fort Lewis" which are legacy references and will not change over time. Others are temporary and will change to Joint Base Lewis-McChord as revisions and updates occur to those references.

**6. List of permits/clearances required: None required**

**7. Construction site categorization: AR 200-1, Chapter 15-6 (3)(b)**

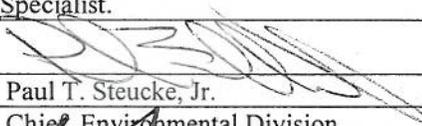
- a. *The garrison commander is responsible for the environmental survey including an unexploded ordnance survey, and associated documentation of a proposed MILCON or NAF construction site before site selection. The IMA region director is responsible for certifying the site categorization.*
- b. Sites are classified into the three following categories:
  - 1. Category I: There is no reason to suspect contamination will be encountered during construction.
  - 2. Category II: There is no known contamination; there remains some potential that contamination may be encountered during construction.
  - 3. Category III: The site is known to be contaminated or there is a strong suspicion contamination will be encountered during construction.

Project location(s)	Category code	Reason for code
On the southern corner of D Street and 8 <sup>th</sup> Street on JBLM-North, as well as parts of the interior area of that same block.	III	There is a strong suspicion that contamination will be encountered during construction, due to this area formerly having being used as a range. UXO have been found at the construction sites neighboring this project's site on multiple sides and so the likelihood is higher that UXO will be found here as well.

**8. Survey assessment concurrence**

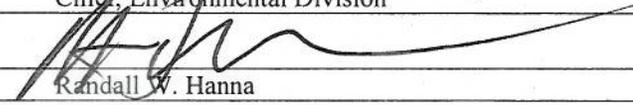
a. Prepared by Carol McAdams, NEPA Specialist.

b. Reviewed and concurred on by:

  
Paul T. Steucke, Jr.  
Chief, Environmental Division

19 July 10  
date

c. Reviewed and concurred on by:

  
Randall W. Hanna  
Deputy Director of Public Works

21 July 2010  
date

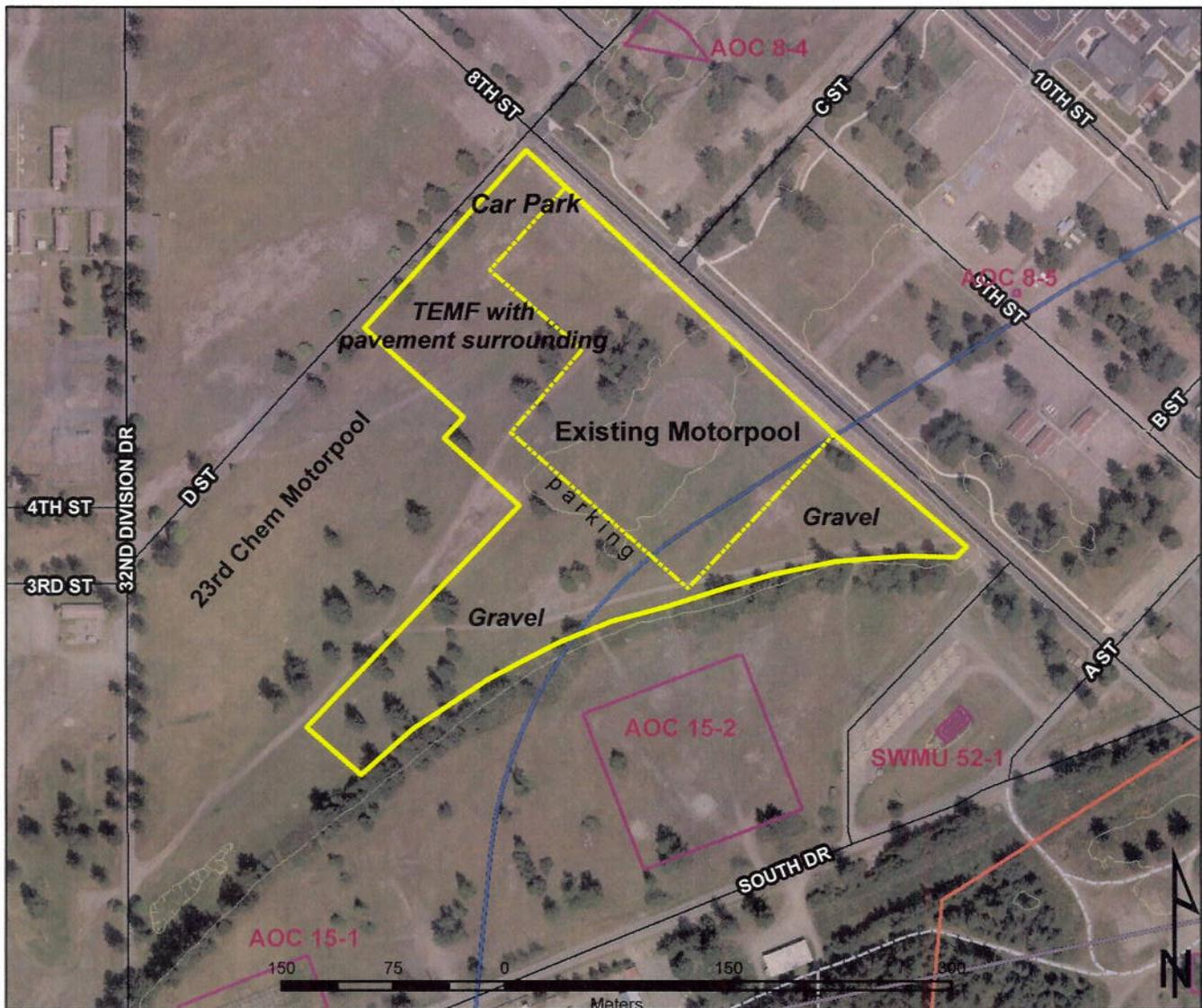
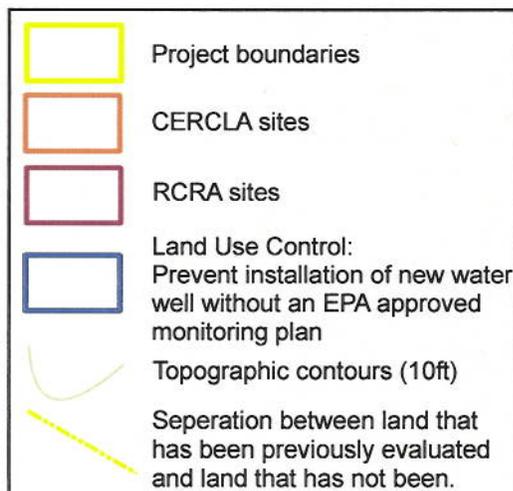


Figure 1: Overview of proposed project site with environmental issues shown (PN 69167).



*PN 69167 was originally a project for the construction of an entire complex for the Expeditionary Sustainment Command; however, the ESC will not be moving to Joint Base Lewis-McChord and therefore the monies put against their construction projects has been reallocated to other units.*

*The 864th Bn was in need of a small TEMF and monies from the ESC was used to fulfill that need.*

**General Conformity  
Record of Non-Applicability**

**Project/Action Name:** Construct TEMF for 864<sup>th</sup> EN

**Project/Action Number:** NEPA 10-PWE-047/CM

**Project/Action POC:** Carol McAdams

**Project Proposed Dates:** FY 10

**Date:** 19 July 2010

Conformity under Clear Air Act, Section 176 has been evaluated for the above described project per 40 CFR 93. The requirements of this rule are not applicable to this project/action because:

1.  The project/action is described as an exempt action under 40 CFR 51.853(c) (2) (ii)

The exemption taken is: Continuing and recurring activities.

OR

2.  Total direct and indirect emissions from the project/action have been estimated at 5.14 tons VOC, 46.99 tons NOx and 27.29 tons CO are below the de minimus threshold established at 40 CFR 51.853 (b) of 100 tons VOC, 100 tons NOx, and 100 tons CO.

AND

The above project/ action is not considered "regionally significant" under 40 CFR 93.153 (i).

The supporting documentation and emissions estimates are:

( X ) ATTACHED

( ) ATTACHED TO NEPA DOCUMENT

( ) OTHER:

Prepared by: \_\_\_\_\_



Tom Olsen  
Environmental Engineer  
Air Program Manager

Action Tile: 864th TEMF

Financing Source: MCA

Emission Source	tons/year							
	CO	NOx	VOC	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	CO <sub>2</sub>	
Commuting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Ground Training	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Construction	27.29	46.99	5.143	5.064	4.49	0.20	4675.78	
Maintenance operations	-	-	0.00	-	-	-	-	
WWTP	-	-	0.0000	-	-	-	-	
AAFES	-	-	0.00	-	-	-	-	
Helicopter Emissions	0	0	0	0	0	0	0	
New Stationary Sources	0	0	0	0	0	0	0	

Total Emission for Action	tons/year							
	CO	NOx	VOC	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	CO <sub>2</sub>	
	27.29	46.99	5.14	5.06	4.49	0.20	4675.78	

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REQUEST FOR PROPOSAL W912DW-09-T-5400

**864<sup>TH</sup> ENGINEERING BATTALION SMALL TACTICAL  
EQUIPMENT MAINTENANCE FACILITIES (TEMF)**

**PN 069167, FY 2009**

JOINT BASE LEWIS-McCHORD, WASHINGTON

Appendix F: Conceptual Aesthetic Considerations

**APPENDIX F****PHOTOS OF SURROUNDING BUILDINGS**

- E-1 **PURPOSE:** Photographic examples of buildings are provided in this appendix to illustrate the architectural style/requirements and exterior materials currently existing on North Fort Joint Base Lewis-McChord.
- E-2 **CONTEXT:** Where the facility to be constructed is an infill project, the exterior shall use the same colors as 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:** Photographs presented in this Appendix are intended to illustrate the architectural theme of North Fort Joint Base Lewis-McChord. These photographs 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.

Photo 1 – Rendering of North Fort TEMF-(illustrates architectural appearance standard for this project)



Photo 2– 864<sup>th</sup> Engineering Battalion Medium TEMF located directly adjacent on the east/northeast side of the PN069167 site (provided for color reference only)



**EXISTING EXTERIOR COLORS:** The following are existing colors (for reference only) used on the 864<sup>th</sup> Engineering Battalion Medium TEMF:

Metal Roof-AEP Span Cool Weathered Copper

Overhead Coiling Doors, Man doors, Gutters/Fascia-to match roof panels

Metal Wall Panel-AEP Span Cool Sierra Tan

Louvers, Downspouts, Veneer Flashing-to match metal wall panels

Split face CMU-Mutual Materials Mesa Tan

Exterior Brick-to match Mutual Materials Vintage wire cut mission finish

Window Frames-medium bronze

Photo 3 – Echo Block Battalion HQ facility near 22<sup>nd</sup> and C Streets.  
(Illustrates building base, upper and lower wall texture / appearance required.)



Photo 4 – Echo Block UEPH facility near 17<sup>th</sup> and A Streets.  
(Illustrates side gabled roofs with parapet end walls)



Photo 5 – BN HQ facility near 20th and D Streets  
(Illustrates brick appearance of wall surface on single story facility, exposed gutters with fascias, as well as circular accent details)



Photo 6 – Battalion HQ facility near 20th and D Streets  
(Illustrates balanced fenestration and building elements laid out in a syncopated rhythm)



Photo 7 – Facility near Pendleton Ave & 9<sup>th</sup> Div Dr.  
(Illustrates asymmetrical balanced fenestration, building voids and massing)



Photo 8 – Dormer examples.  
(Illustrates different methods of daylighting internal spaces)

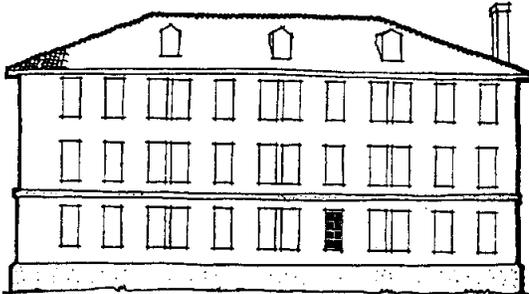


Round-headed dormer example

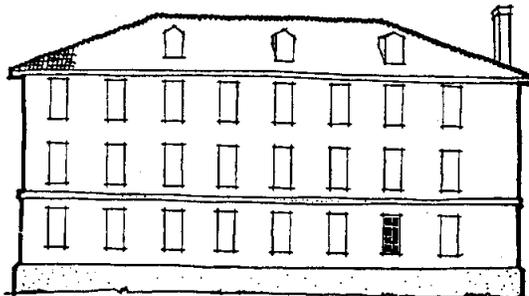


Gabled dormer example

Figure 9 – Syncopated Rhythm of Building Elements  
(Illustrates the required 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

Figure 10 – Golden Section  
(Illustrates use of the Golden Section ( $a/b=1.618$ ) in determining proportion and massing of Fort Lewis facilities)

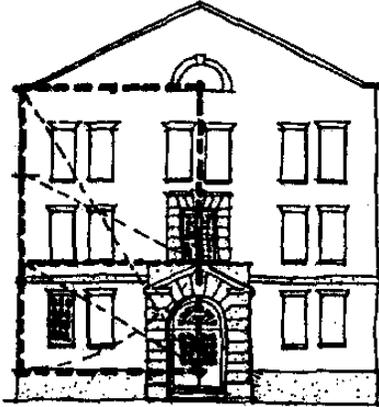


Photo 11 – Conceptual images of a typical North Fort Lewis Battalion HQ facility.  
(Illustrates vestibule entries with exterior covered areas)



Photo 12 – Lawnmower Storage Building  
(illustrates same style and materials use as building served)



Photo 13 – Conceptual images of a typical North Fort Lewis Brigade HQ facility.



Photo 14 – Echo Block UEPH facility near 17<sup>th</sup> and A Streets (courtyard view)



Photo 15– Brigade HQ facility near 24th and D Streets



Photo 16 – Alpha Block Company Operations Facilities near 10th and C Streets (view from SW)



site view from southwest

Photo 17 – Alpha Block Company Operations Facilities near 10th and C Streets



Photo 18 – Rendering of North Fort Physical Fitness Center



Photo 19 – Rendering of North Fort UEPH Barracks



Photo 20 – Rendering of North Fort Company Operations Facility



Photo 21 – Rendering of North Fort Battalion HQ Facility



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REQUEST FOR PROPOSAL W912DW-09-T-5400

**864<sup>th</sup> ENGINEERING BATTALION SMALL TACTICAL  
EQUIPMENT MAINTENANCE FACILITIES (TEMF)**

**PN 069167, FY 2009**

JOINT BASE LEWIS-McCHORD, WASHINGTON

Appendix G: GIS Data

APPENDIX G  
GIS Data

Not Used

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REQUEST FOR PROPOSAL W912DW-09-T-5400

**864<sup>TH</sup> ENGINEERING BATTALION SMALL TACTICAL  
EQUIPMENT MAINTENANCE FACILITIES (TEMF)**

**PN 069167, FY 2009**

JOINT BASE LEWIS-McCHORD, WASHINGTON

Appendix H: Exterior Signage

## 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).



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EQUIPMENT MAINTENANCE FACILITIES (TEMF)**

**PN 069167, FY 2009**

JOINT BASE LEWIS-McCHORD, WASHINGTON

Appendix I: Acceptable Plants List

PLANT SELECTION LIST Plant Materials Suitability Section		Type		Growth		Flower		Interest		Light		Resistant		Soil Moisture		Function																
		Deciduous	Evergreen	Slow	Medium	Fast	Fall	Summer	Spring	Flower	Bark	Foliage	Shade	Sun/Shade	Sun	Drought	Pest	Moist	Average	Dry	Street Tree	Shade Tree	Screen	Massing	Windbreak	Hedge	Bank Cover	Specimen				
Botanical Name	Common Name	Characteristics										Culture						Use														
<b>DECIDUOUS TREES</b>																																
Acer Circinatum	Vine Maple	♦			♦							♦	♦		♦	♦																
Acer Ginnala	Amur Maple	♦			♦							♦			♦	♦															♦	
Acer Griseum	Paperbark Maple	♦			♦							♦			♦	♦															♦	
Acer Palmatum	Japanese Maple	♦			♦							♦	♦		♦	♦															♦	
Acer Rubrum	“Scarlet Sentinel” Red Maple	♦				♦						♦			♦	♦					♦											
Acer Rubrum	“Autumn Blaze” Red Maple	♦				♦						♦			♦	♦					♦											
Acer Rebrum	“Red Sunset” Red Maple	♦				♦						♦			♦	♦					♦											
Acer Saccharum	“Bonfire” Sugar Maple	♦			♦							♦			♦	♦																
Acer Saccharum	“Green Mountain Sugar Maple	♦			♦			♦				♦			♦	♦																
Amelanchier Laevis	Serviceberry	♦			♦				♦			♦					♦															
Betula Jacquemontii	Jacquemont Birch	♦				♦						♦				♦																
Carpinus Betulus “Fastigiata”	Columnar Hornbeam	♦		♦								♦				♦					♦			♦	♦							
Cercidiphyllum Japonicum	Katsura Tree	♦		♦								♦			♦	♦					♦											
Cercis Occidentalis	Western Rosebud	♦			♦			♦	♦	♦	♦	♦			♦	♦					♦											♦
Cornus Kousa	Kousa Dogwood	♦		♦				♦	♦	♦	♦	♦			♦	♦																♦
Continus Coggyria “Purpureus”	Smoke Tree	♦		♦				♦	♦					♦	♦	♦																
Fraxinus Oxycarpa	Raywood Ash	♦			♦			♦						♦	♦	♦																
Fraxinus Pennsylvanica	Cimmaron Ash	♦			♦									♦	♦	♦																
Fraxinus Pennsylvanica “Marshall’s Seedless”	Seedless Green Ash	♦			♦			♦						♦	♦	♦																
Fraxinus Pennsylvanica	Patmore Ash	♦			♦			♦						♦	♦	♦																
Ginkgo Bilboa “Autumn Gold”	Maidenhair Tree	♦		♦				♦						♦	♦	♦																♦
Gleditsia Triacanthos	“Shademaster” Honey Locust	♦			♦									♦	♦	♦																♦
Gleditsia Triacanthos	“Skyline” Honey Locust	♦			♦									♦	♦	♦																♦

PLANT SELECTION LIST Plant Materials Suitability Section		Type		Growth		Flower		Interest		Light			Resistant		Soil Moisture			Function										
		Deciduous	Evergreen	Slow	Medium	Fast	Fall	Summer	Spring	Flower	Bark	Foliage	Shade	Sun/Shade	Sun	Drought	Pest	Moist	Average	Dry	Street Tree	Shade Tree	Screen	Massing	Windbreak	Hedge	Bank Cover	Specimen
Botanical Name	Common Name	Characteristics											Culture					Use										
<b>DECIDUOUS TREES - CONTINUED</b>																												
Larix Occidentalis	Western Larch	♦				♦					♦			♦			♦							♦	♦			♦
Liquidambar styracflua	American Sweetgum	♦			♦					♦	♦			♦				♦										
Liriodendrum Tulipifera	Tulip Tree	♦				♦		♦		♦	♦			♦				♦					♦					
Magnolia Soulangeana	Saucer Magnolia	♦			♦			♦	♦					♦				♦					♦					♦
Magnolia Stellata	Star Magnolia	♦		♦				♦	♦					♦				♦										♦
Malus "Centurion"	Centurion Crabapple	♦			♦			♦	♦					♦				♦										♦
Malus "Prairiefire"	Prairiefire Crabapple	♦			♦			♦	♦					♦				♦										♦
Malus "Sugartyme"	Sugartyme Crabapple	♦			♦			♦	♦					♦				♦										♦
Parrotia Persica	Persian Parrotia	♦		♦				♦	♦	♦	♦			♦				♦										♦
Pyrus Calleryana	"Chanticleer" Flowering Pear	♦			♦			♦	♦					♦				♦										♦
Styrax Obassia	Fragrant Snowbell	♦		♦				♦		♦				♦				♦										♦
Tilia Tomentosua	Silver Linden	♦			♦			♦		♦				♦	♦			♦										♦
Tilia Cordata	Greenspire Linden	♦			♦			♦		♦				♦	♦			♦										♦
Zelkova Serrata	"Village Green" Sawleaf Zelkova	♦				♦				♦				♦	♦			♦										♦





PLANT SELECTION LIST Plant Materials Suitability Section		Type		Growth			Flower			Interest			Light			Resistant		Soil Moisture			Function							
		Deciduous	Evergreen	Slow	Medium	Fast	Fall	Summer	Spring	Flower	Bark	Foliage	Shade	Sun/Shade	Sun	Drought	Pest	Moist	Average	Dry	Street Tree	Shade Tree	Screen	Massing	Windbreak	Hedge	Bank Cover	Specimen
		Botanical Name	Common Name	Characteristics												Culture						Use						
<b>EVERGREEN SHRUBS - CONTINUED</b>																												
Prunus Lauracerasus	"Otto Luyken" Laurel		♦			♦			♦	♦		♦		♦		♦		♦						♦	♦		♦	
Prunus Laurocerasus	"Zabel" Laurel		♦			♦			♦	♦		♦		♦		♦		♦						♦	♦			♦
Rhododendron	Anah Kruschkle Rhododendron		♦	♦				♦		♦		♦		♦				♦						♦	♦			♦
Rhododendron	Gomer Waterer Rhododendron		♦	♦				♦		♦		♦		♦				♦										♦
Rhododendron	Loder's White Rhododendron		♦	♦				♦		♦		♦		♦				♦										♦
Rhododendron	"Lucy Lou" Dwarf Rhododendron		♦	♦					♦	♦		♦		♦				♦							♦			
Rhododendron	"Myrtifolium" Dwarf Rhododendron		♦	♦				♦		♦		♦		♦				♦							♦			
Rhododendron	"PJM" Rhododendron		♦	♦					♦	♦		♦		♦				♦							♦			
Rhododendron	"Purple Splendor" Rhododendron		♦	♦				♦		♦		♦	♦	♦				♦						♦	♦			♦
Rhododendron	Dwarf Rhododendron		♦	♦					♦	♦		♦	♦	♦				♦							♦			
Rhododendron	Rosamundi Rhododendron		♦	♦					♦	♦		♦		♦				♦							♦			♦
Rhododendron	Unique Rhododendron		♦	♦					♦	♦		♦		♦				♦							♦	♦		
Rhododendron	Yakusimanum		♦	♦				♦		♦		♦		♦				♦							♦			
Rosmarinus Officinalis	Rosemary		♦			♦			♦	♦		♦		♦	♦	♦		♦							♦			♦
Sarcococca Ruscifolia	Fragrant Sarcococca		♦		♦				♦	♦		♦	♦					♦							♦			
Senecio Greyi	Senecio		♦			♦			♦		♦		♦	♦				♦							♦			
Taxus Baccata "Repandens"	Spreading English Yew		♦	♦								♦		♦				♦							♦			♦
Vaccinium Ovatum	Evergreen Huckleberry		♦	♦								♦		♦				♦							♦			
Viburnum Davidii	Dauids Virburnum		♦		♦				♦	♦		♦		♦				♦							♦			♦
Viburnum Tinus	"Spring Bouquet" Laurustinus		♦		♦			♦		♦		♦		♦				♦							♦	♦		♦

PLANT SELECTION LIST Plant Materials Suitability Section		Type		Growth			Flower			Interest			Light			Resistant		Soil Moisture			Function							
		Deciduous	Evergreen	Slow	Medium	Fast	Fall	Summer	Spring	Flower	Bark	Foliage	Shade	Sun/Shade	Sun	Drought	Pest	Moist	Average	Dry	Street Tree	Shade Tree	Screen	Massing	Windbreak	Hedge	Bank Cover	Specimen
<b>DECIDUOUS SCHRUBS</b>																												
Amelanchier Alnifolia	Western Serviceberry				♦				♦	♦	♦	♦	♦	♦				♦										
Azalea Exgeny	Exbury Azalea	♦			♦				♦	♦	♦	♦	♦	♦														♦
Azalea Mollis	Azalea Mollis	♦			♦				♦	♦	♦	♦	♦	♦														♦
Berberis Thunbergii	“Red Dwarf” Japanese Barberry	♦		♦										♦	♦													
Berberis Thunbergii	“Crimson Pygmy” Japanese Barberry	♦		♦										♦	♦													
Berberis Thunbergii	“Rose Glow” Japanese Barberry	♦												♦	♦													
Caryopteris X Clandonensis	Bluebeard	♦			♦		♦	♦						♦	♦													
Cornus Stolonifera	Redtwig Dogwood	♦				♦		♦						♦												♦	♦	
Cornus Stolonifera	“Silver & Gold” Dogwood	♦				♦		♦						♦														
Cotoneaster Horizontalis	Rock Cotoneaster	♦			♦				♦					♦	♦		♦											
Enkianthus Campanulatus	Enkianthus	♦		♦					♦	♦	♦	♦	♦					♦										♦
Euonymus Alata “Compacta”	Compact Burning Bush	♦				♦								♦	♦													♦
Hamamelis X Intermedia	“Diane” Witchhazel	♦			♦				♦	♦	♦	♦	♦						♦									♦
Holodiscus Discolor	Ocean Spray	♦			♦				♦					♦														
Hydrangea Macrophylla	“Lacecap” Hydrangea	♦				♦		♦						♦														
Oemleria Cerasiformis	Indian Plum	♦			♦				♦	♦	♦	♦	♦															
Philadelphus Lewisii	Mock Orange	♦				♦		♦						♦														
Potentilla Fruticosa	Shrubby Cinquefoil	♦			♦				♦					♦	♦													♦
Rhus Glabra	Smooth Sumac	♦							♦					♦	♦													
Rhus Typhina “Laciniata”	Cutleaf Sumac	♦							♦					♦	♦													♦
Ribes Aureum	Golden Currant	♦				♦			♦	♦	♦	♦	♦															
Ribes Sanguineum	“Red Flowering” Currant	♦				♦			♦	♦	♦	♦	♦															
Ribes Sanguineum	“Elk River Red” Currant	♦				♦			♦	♦	♦	♦	♦															
Rosa Rugosa	Ramanas Rose	♦				♦		♦	♦	♦	♦	♦	♦															
Rosa Woodsii	Wood’s Rose	♦				♦		♦	♦	♦	♦	♦	♦															♦
Spiraea Nipponica	“Snowmound” Spiraea	♦				♦			♦					♦														
Symphoricarpos Albus	Common Strawberry	♦				♦			♦					♦														♦
Syringa Meyerii “Palibin”	Dwarf Korean Lilac	♦				♦			♦	♦	♦	♦	♦															♦
Viburnum Tomentosum “Mariesii”	Doublefile Viburnum	♦				♦			♦					♦	♦													♦

PLANT SELECTION LIST Plant Materials Suitability Section		Type		Growth			Flower			Interest			Light			Resistant		Soil Moisture		Function									
		Deciduous	Evergreen	Slow	Medium	Fast	Fall	Summer	Spring	Flower	Bark	Foliage	Shade	Sun/Shade	Sun	Drought	Pest	Moist	Average	Dry	Street Tree	Shade Tree	Screen	Massing	Windbreak	Hedge	Bank Cover	Specimen	
Botanical Name	Common Name	Characteristics										Culture						Use											
<b>GROUND COVERS/VINES</b>																													
Ajuga Reptans	Carpet Bugle	♦					♦		♦		♦			♦					♦										
Arctostaphylos Uva Ursi	Kinnikinnick		♦	♦					♦	♦	♦				♦	♦				♦									♦
Calluna Vulgaris	"Aurea" Heather		♦						♦	♦	♦				♦					♦					♦				♦
Calluna Vulgaris	"Corbet Red" Heather		♦		♦				♦	♦	♦				♦					♦					♦				♦
Calluna Vulgaris	"Robert Chapman" Heather		♦		♦				♦	♦	♦				♦					♦					♦				♦
Clematis Armandii	Evergreen Clematis					♦			♦	♦	♦				♦					♦									
Clematis Montana "Rubens"	Deciduous Clematis	♦					♦		♦	♦	♦				♦					♦									
Cotoneaster Dammeri	Bearberry Cotoneaster		♦			♦			♦		♦				♦	♦				♦									♦
Erica Carnea	"Mediterranean Pink" Heath		♦	♦					♦	♦	♦				♦					♦									♦
Erica Carnea	"Springwood White" Heath		♦	♦					♦	♦	♦				♦					♦									♦
Erica Carnea	"Winter Beauty" Heath		♦	♦					♦	♦	♦				♦					♦									♦
Euonymus Fortunei "Colorata"	"Purple Leaf" Wintercreeper		♦			♦					♦			♦						♦									
Euonymus Fortunei	"Kewensis" Wintercreeper		♦			♦					♦			♦	♦					♦									
Fragaria Chiloensis	Sand Strawberry		♦			♦			♦	♦	♦				♦					♦									♦
Gaultheria Shallon	Salal		♦		♦				♦		♦			♦	♦					♦									♦
Hydrangea Petiolaris	Climbing Hydrangea	♦				♦		♦		♦	♦			♦					♦										
Hypericum Calycium	St. Johnswort		♦			♦			♦	♦	♦				♦	♦				♦									♦
Juniperis Conferta "Blue Pacific"	Shore Juniper		♦		♦						♦				♦	♦				♦						♦			♦
Juniperis Horizontalis	"Blue Chip" Juniper		♦		♦						♦				♦	♦				♦						♦			♦
Juniperis Horizontalis	"Prince of Wales" Juniper		♦		♦						♦				♦	♦				♦						♦			♦
Juniperis Horizontalis	"Wilton" Juniper		♦		♦						♦				♦	♦				♦						♦			♦
Juniperis Procumbens	"Green Mound Garden" Juniper		♦		♦						♦				♦	♦				♦						♦			♦
Juniperis Sabina	"Braodmoor" Juniper		♦		♦						♦				♦	♦				♦						♦			♦

PLANT SELECTION LIST Plant Materials Suitability Section		Type		Growth			Flower			Interest			Light			Resistant		Soil Moisture			Function							
		Deciduous	Evergreen	Slow	Medium	Fast	Fall	Summer	Spring	Flower	Bark	Foliage	Shade	Sun/Shade	Sun	Drought	Pest	Moist	Average	Dry	Street Tree	Shade Tree	Screen	Massing	Windbreak	Hedge	Bank Cover	Specimen
Botanical Name	Common Name	Characteristics											Culture						Use									
<b>GROUND COVERS/VINES - CONTINUED</b>																												
Mahonia Nervosa	Longleaf Mahonia		♦		♦					♦	♦		♦			♦			♦									♦
Mahonia Repans	Creeping Mahonia		♦		♦					♦	♦		♦			♦			♦									♦
Pachysandra Terminalis	Japanese Spurge		♦	♦						♦		♦	♦					♦										
Rosmarinus Officinalis "Prostratus"	Creeping Rosemary		♦			♦				♦	♦			♦	♦	♦			♦									♦
Rubus Calycinooides "Emerald Carpet"	Creeping Raspberry		♦			♦				♦	♦		♦					♦										♦
Sarcococca Hookeriana "Humilis"	Low Sweetbox		♦		♦					♦		♦						♦										
Thymus Pesudolanuginosus	Wooly Thyme		♦		♦				♦			♦			♦	♦			♦									
Thymus Serphyllum	Wild Thyme		♦		♦				♦			♦			♦	♦			♦									
Vinca Minor	Dwarf Periwinkle		♦			♦				♦	♦		♦					♦										♦

PLANT SELECTION LIST Plant Materials Suitability Section		Type		Growth			Flower			Interest			Light			Resistant		Soil Moisture			Function							
		Deciduous	Evergreen	Slow	Medium	Fast	Fall	Summer	Spring	Flower	Bark	Foliage	Shade	Sun/Shade	Sun	Drought	Pest	Moist	Average	Dry	Street Tree	Shade Tree	Screen	Massing	Windbreak	Hedge	Bank Cover	Specimen
<b>GRASSES &amp; PERENNIALS</b>																												
Acorus Gramineus "Ogon"	Sweetflag		♦		♦									♦			♦											♦
Carex Morrowii "Aureo Variegata"	Variegated Sedge			♦										♦				♦										
Epimedium Grandiflorum "Rose Queen"	Bishop's Hat								♦	♦			♦		♦					♦								
Epimedium X Rubrum	Bishop's Hat					♦			♦	♦			♦		♦					♦								
Geranium SP.	Cranesbill					♦		♦		♦			♦							♦								
Helictotrichon Sempervirens	Blue Oat Grass		♦						♦	♦				♦	♦													
Hemerocallis Sp.	Daylily					♦		♦		♦				♦	♦													
Heuchera Micrantha	"Palace Purple" Coral Bells					♦			♦	♦			♦								♦							
Hosta Sp.	Plantain Lily			♦				♦		♦			♦							♦								
Liatis Spicata "Kobold"	Gayfeather					♦		♦		♦				♦	♦						♦							
Liriope Muscari	Big Blue Lilyturf			♦						♦		♦									♦							
Lithodora Diffusa	"Grace Ward" Lithodora					♦		♦		♦				♦	♦						♦							♦
Miscanthis Sinensis "Yaku Jima"	Silver Grass					♦		♦		♦			♦								♦							♦
Miscanthis Sinensis "Zebrinus"	Zebra Grass					♦		♦		♦			♦								♦							♦
Ophiopogon Japonicus "Nana"	Dwarf Mondo Grass			♦				♦					♦	♦							♦							
Pennisetum Alopecuroides	Fountain Grass					♦		♦		♦			♦								♦							
Sedum Spurium	"Dragon's Blood" Stonecrop					♦		♦		♦			♦		♦						♦							
Veronics Peduncularis	"Georgia Blue" Speedwell					♦			♦	♦				♦							♦							

Links  
[Go to Appendix P](#)  
[Go to Table of Contents](#)

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REQUEST FOR PROPOSAL W912DW-09-T-5400

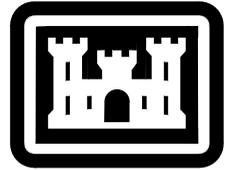
**864<sup>th</sup> ENGINEERING BRIGADE, TACTICAL EQUIPMENT  
MAINTENANCE FACILITIES, TEMF  
PN 069167, FY 2009**

FORT LEWIS, WASHINGTON

Appendix J: Drawings

Revised: Amendment #1 dated 08/06/10

- Conceptual Site Electrical Plan Sheet ES101



**US Army Corps  
of Engineers  
Seattle District**

DRAWING SHEET INDEX

G-001	COVER SHEET
C-001	LEGEND & PROJECT LOCATION MAP
CD101	CONCEPTUAL SITE DEMOLITION PLAN
CS101	CONCEPTUAL SITE LAYOUT PLAN
CU101	CONCEPTUAL SITE UTILITY PLAN
ES101	CONCEPTUAL SITE ELECTRICAL PLAN

**864TH ENGINEERING BATTALION TACTICAL EQUIPMENT  
MAINTENANCE FACILITY (TEMF)  
*JOINT BASE LEWIS-McCHORD, WASHINGTON***

**FINAL RFP SUBMISSION**

**PROJECT NO. 069167      FY09**

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PURPOSES**

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Architects Engineers Planners**  
5801 N. Broadway Extension, Ste. 500 - Oklahoma City, Ok. 73118  
Telephone 405-840-2931 - Facsimile 405-842-7750

SYMBOL	ZONE	DESCRIPTION	DATE	BY

REVISIONS  
U.S. ARMY  
ENGINEER DISTRICT, SEATTLE  
CORPS OF ENGINEERS  
SEATTLE, WASHINGTON

864TH ENGINEERING SMALL TEMF  
COVER SHEET & SHEET INDEX

DISK	GRM	CHK	RAE	SHEET	G-001
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# LEGEND

EXISTING	NEW	DESCRIPTION
		SIGN
		TREE
		FLAGPOLE
		BOLLARD
		CATCH BASIN
		CURB INLET
		HEADWALL
		STORM DRAIN MANHOLE
		STORM WATER INCEPTORS
		FIRE HYDRANT
		FIRE DEPARTMENT CONNECTION
		WATER VALVE
		WATER VAULT
		WATER METER
		POST INDICATOR VALVE
		SANITARY SEWER CLEANOUT
		SANITARY SEWER MANHOLE
		UTILITY POLE
		LIGHT POLE
		DUAL LIGHT POLE
		GUY WIRE ANCHOR
		ELECTRIC VAULT
		ELECTRIC MANHOLE
		ELECTRIC TRANSFORMER
		ELECTRIC JUNCTION BOX
		OVERHEAD POWER POLE
		TELEPHONE VAULT
		TELEPHONE MANHOLE
		COMMUNICATIONS VAULT
		COMMUNICATIONS MANHOLE
		PADMOUNTED SECTIONALIZING SWITCH
		GAS VALVE
		GAS RISER
		GAS VAULT
		GAS METER
		CONTOUR (MAJOR)
		CONTOUR (MINOR)
		CONSTRUCTION LIMITS / PROJECT LIMIT LINE
		CENTERLINE
		STORM DRAIN LINE
		DOMESTIC WATER LINE
		FIRE WATER LINE
		SANITARY SEWER LINE
		UNDERGROUND ELECTRIC LINE
		UNDERGROUND COMM./TELEPHONE LINE
		GAS LINE
		PROPANE GAS LINE
		PERIMETER SECURITY FENCE
		DEMOLITION OF GRAVEL
		EXISTING CLEAR ZONE
		NEW GRAVEL AREA/CLEAR ZONE
		NEW P.C. CONCRETE PAVEMENT

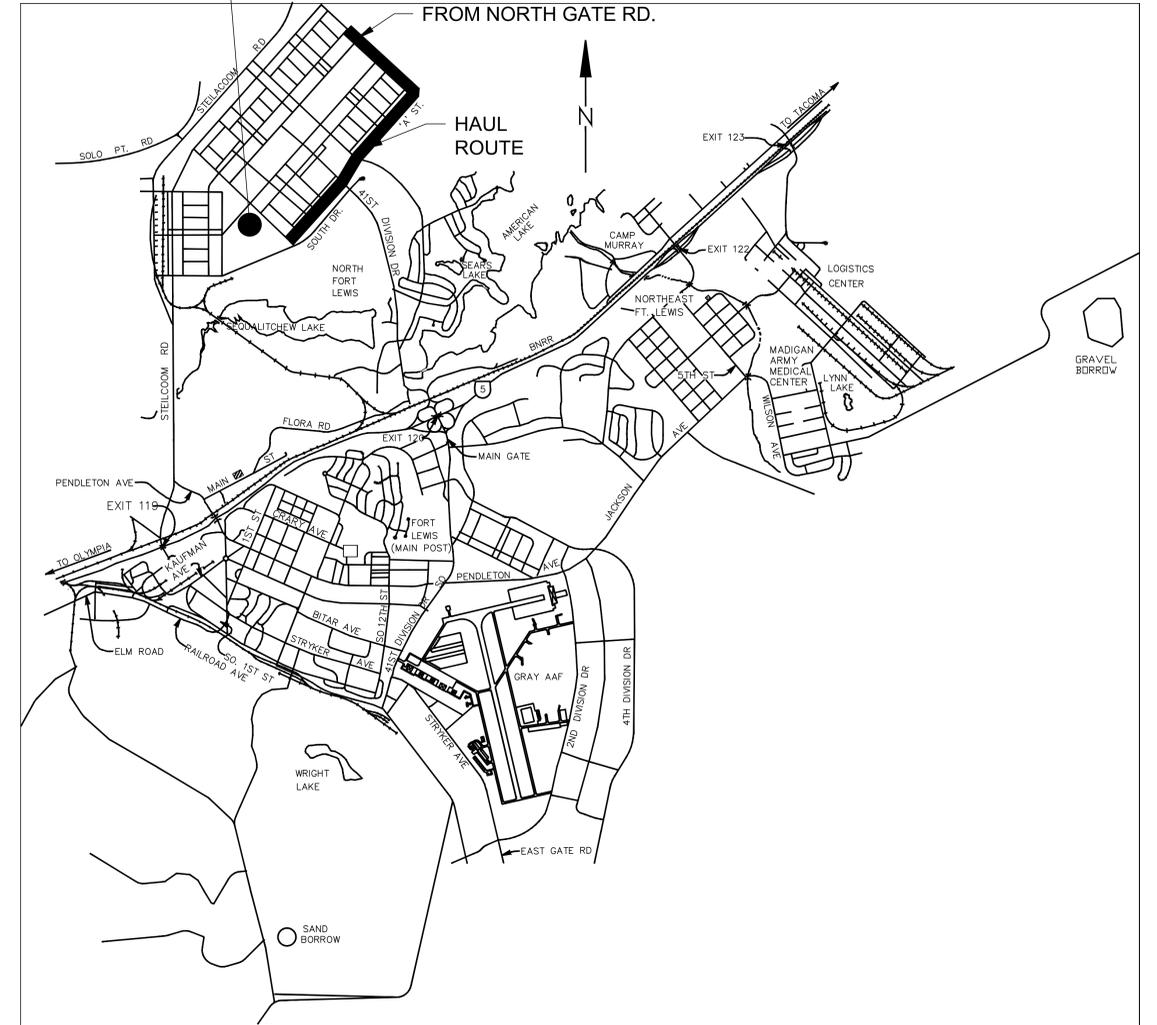


1 VICINITY MAP  
NTS

## ABBREVIATIONS & SYMBOLS

AVP	ALTITUDE VALVE PIT	O/W	OIL/WATER
AFFF	AQUEOUS FILM FORMING FOAM	O.C.E.W.	ON CENTER EACH WAY
B-B	BACK TO BACK	R	PROPERTY LINE
BC	BACK OF CURB	PVC	POLYVINYL CHLORIDE
BIT.	BITUMINOUS	P.C.	PORTLAND CEMENT
BLDG.	BUILDING	P.C.C.	PORTLAND CEMENT CONCRETE
CL	CENTERLINE	P.C. CONC.	PORTLAND CEMENT CONCRETE
CL.	CLEARANCE	P.G.	PROFILE GRADE
CONST.	CONSTRUCT	P.I.V.	POST INDICATOR VALVE
CO.	CLEANOUT	RCP	REINFORCED CONCRETE PIPE
C-C	CENTER TO CENTER	REQD.	REQUIRED
Ø	DIAMETER	R/W	RUNWAY
DIA.	DIAMETER	S	SOUTH
DIP	DUCTILE IRON PIPE	SAN.	SANITARY
DW	DOMESTIC WATER	SD	STORM DRAIN
E	EAST	SE	SPOT ELEVATION
ELEC.	ELECTRIC	SIM.	SIMILAR
ELEV.	ELEVATION	SS	SANITARY SEWER
EXIST.	EXISTING	STA.	STATION
EX.	EXISTING	STR.	STRUCTURE
F-F	FACE TO FACE	SW	SIDEWALK
FC	FACE OF CURB	TH	TANK HEATER LINE
FH	FIRE HYDRANT	TYP.	TYPICAL
FWH	FIRE HYDRANT WATER	TC	TOP OF CURB
FL	FLOWLINE	T/G	TOP OF GRATE
FPS	FIRE PUMP SUCTION	T/R	TOP OF RIM
FPT	FIRE PUMP TEST	TS	TOP OF SURFACE
HNGR.	HANGAR	T/W	TAXIWAY
HOR.	HORIZONTAL	UD	UNDERDRAIN
HTHW	HIGH TEMP. HEATING WATER	UGC	UNDERGROUND COMMUNICATIONS
L.F.	LINEAR FEET	UGE	UNDERGROUND ELECTRIC
MAT'L.	MATERIAL	VERT.	VERTICAL
MIN.	MINIMUM	W	WEST
M.H.	MANHOLE	WV	WATER VALVE
N	NORTH	XFMR	TRANSFORMER
NO.	NUMBER		
O.C.	ON CENTER		

## PROJECT LOCATION



2 PROJECT LOCATION MAP  
NTS

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REVISIONS  
U.S. ARMY  
ENGINEER DISTRICT, SEATTLE  
CORPS OF ENGINEERS  
SEATTLE, WASHINGTON

864TH ENGINEERING SMALL TEMP

LEGEND & PROJECT LOCATION MAP

DATE	BY	DESCRIPTION
30 JUNE 10	RAE	ISSUED FOR CONSTRUCTION

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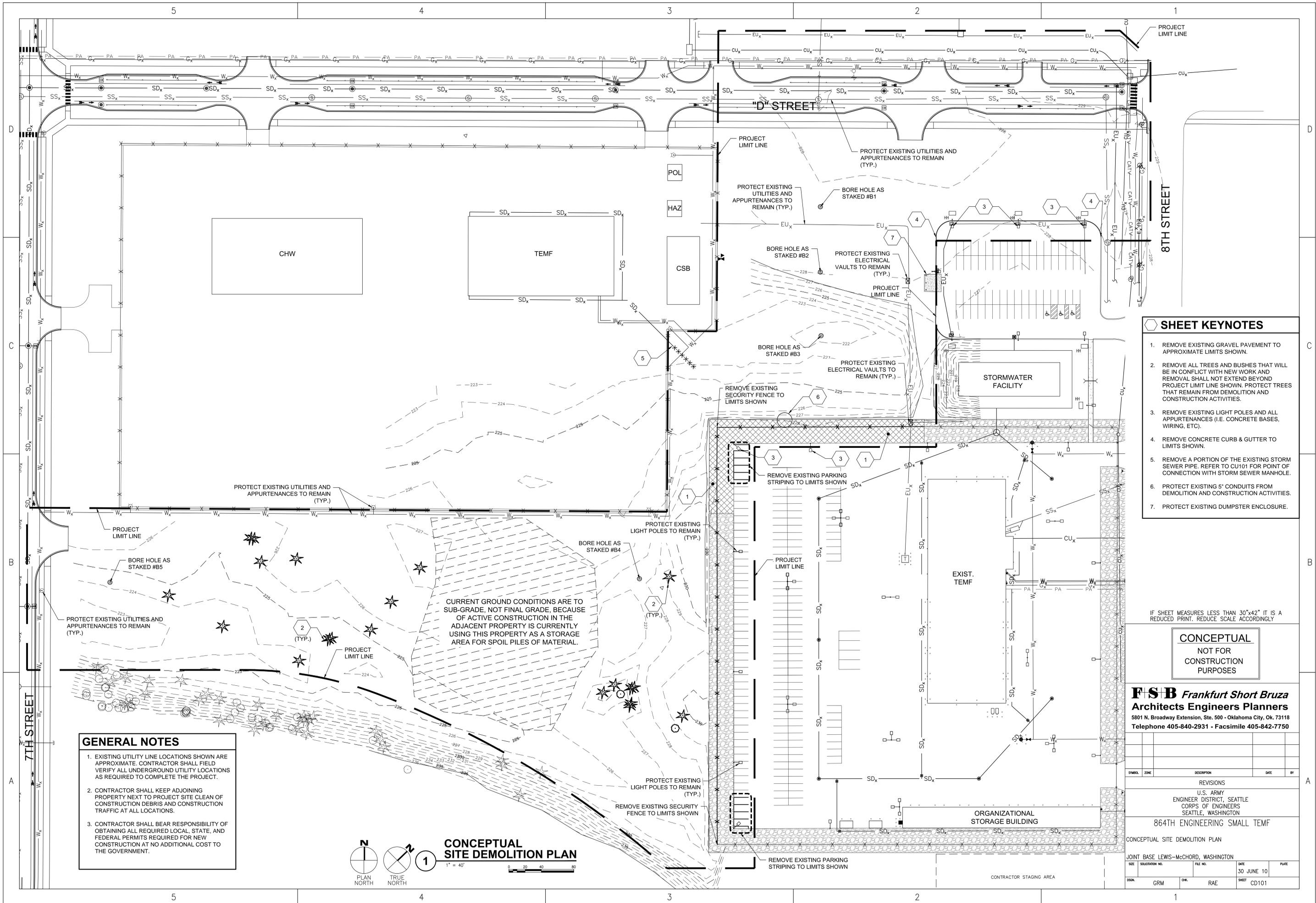
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NO.	DATE	BY	DESCRIPTION
1	30 JUNE 10	RAE	



- SHEET KEYNOTES**
1. REMOVE EXISTING GRAVEL PAVEMENT TO APPROXIMATE LIMITS SHOWN.
  2. REMOVE ALL TREES AND BUSHES THAT WILL BE IN CONFLICT WITH NEW WORK AND REMOVAL SHALL NOT EXTEND BEYOND PROJECT LIMIT LINE SHOWN. PROTECT TREES THAT REMAIN FROM DEMOLITION AND CONSTRUCTION ACTIVITIES.
  3. REMOVE EXISTING LIGHT POLES AND ALL APPURTENANCES (I.E. CONCRETE BASES, WIRING, ETC).
  4. REMOVE CONCRETE CURB & GUTTER TO LIMITS SHOWN.
  5. REMOVE A PORTION OF THE EXISTING STORM SEWER PIPE. REFER TO CU101 FOR POINT OF CONNECTION WITH STORM SEWER MANHOLE.
  6. PROTECT EXISTING 5" CONDUITS FROM DEMOLITION AND CONSTRUCTION ACTIVITIES.
  7. PROTECT EXISTING DUMPSTER ENCLOSURE.

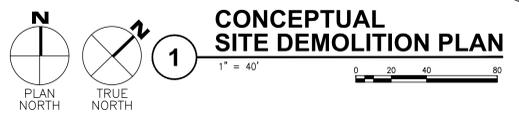
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PURPOSES

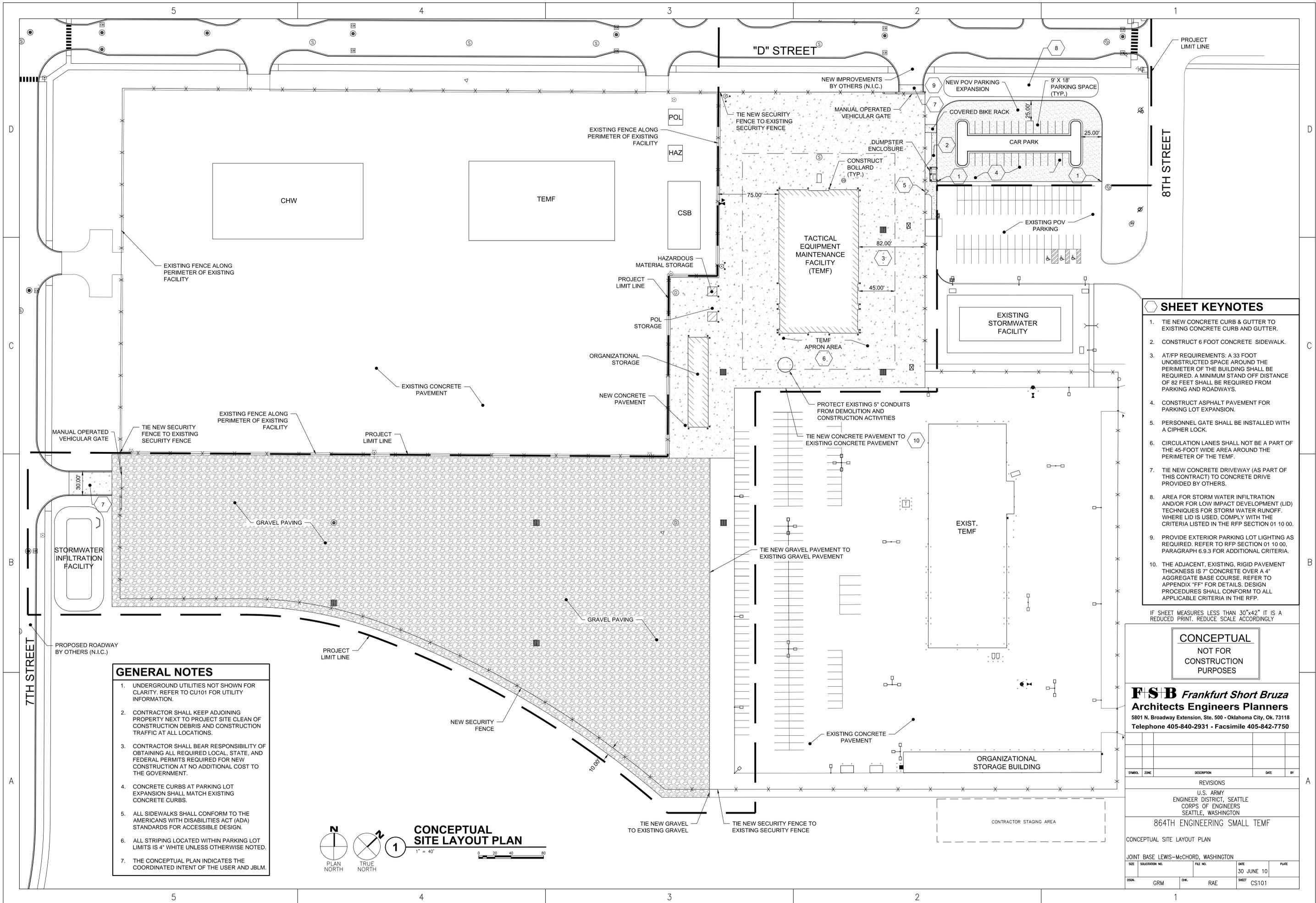
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SYMBOL	ZONE	DESCRIPTION	DATE	BY
REVISIONS				
U.S. ARMY ENGINEER DISTRICT, SEATTLE CORPS OF ENGINEERS SEATTLE, WASHINGTON				
864TH ENGINEERING SMALL TEMF				
CONCEPTUAL SITE DEMOLITION PLAN				
JOINT BASE LEWIS-McCHORD, WASHINGTON				
SIZE	SOLUTION NO.	FILE NO.	DATE	PLATE
			30 JUNE 10	
ISSN	GRM	CHK	RAE	SHEET CD101

- GENERAL NOTES**
1. EXISTING UTILITY LINE LOCATIONS SHOWN ARE APPROXIMATE. CONTRACTOR SHALL FIELD VERIFY ALL UNDERGROUND UTILITY LOCATIONS AS REQUIRED TO COMPLETE THE PROJECT.
  2. CONTRACTOR SHALL KEEP ADJOINING PROPERTY NEXT TO PROJECT SITE CLEAN OF CONSTRUCTION DEBRIS AND CONSTRUCTION TRAFFIC AT ALL LOCATIONS.
  3. CONTRACTOR SHALL BEAR RESPONSIBILITY OF OBTAINING ALL REQUIRED LOCAL, STATE, AND FEDERAL PERMITS REQUIRED FOR NEW CONSTRUCTION AT NO ADDITIONAL COST TO THE GOVERNMENT.



CURRENT GROUND CONDITIONS ARE TO SUB-GRADE, NOT FINAL GRADE, BECAUSE OF ACTIVE CONSTRUCTION IN THE ADJACENT PROPERTY IS CURRENTLY USING THIS PROPERTY AS A STORAGE AREA FOR SPOIL PILES OF MATERIAL.



- GENERAL NOTES**
1. UNDERGROUND UTILITIES NOT SHOWN FOR CLARITY. REFER TO CU101 FOR UTILITY INFORMATION.
  2. CONTRACTOR SHALL KEEP ADJOINING PROPERTY NEXT TO PROJECT SITE CLEAN OF CONSTRUCTION DEBRIS AND CONSTRUCTION TRAFFIC AT ALL LOCATIONS.
  3. CONTRACTOR SHALL BEAR RESPONSIBILITY OF OBTAINING ALL REQUIRED LOCAL, STATE, AND FEDERAL PERMITS REQUIRED FOR NEW CONSTRUCTION AT NO ADDITIONAL COST TO THE GOVERNMENT.
  4. CONCRETE CURBS AT PARKING LOT EXPANSION SHALL MATCH EXISTING CONCRETE CURBS.
  5. ALL SIDEWALKS SHALL CONFORM TO THE AMERICANS WITH DISABILITIES ACT (ADA) STANDARDS FOR ACCESSIBLE DESIGN.
  6. ALL STRIPING LOCATED WITHIN PARKING LOT LIMITS IS 4" WHITE UNLESS OTHERWISE NOTED.
  7. THE CONCEPTUAL PLAN INDICATES THE COORDINATED INTENT OF THE USER AND JBLM.



- SHEET KEYNOTES**
1. TIE NEW CONCRETE CURB & GUTTER TO EXISTING CONCRETE CURB AND GUTTER.
  2. CONSTRUCT 6 FOOT CONCRETE SIDEWALK.
  3. AT/FP REQUIREMENTS: A 33 FOOT UNOBSTRUCTED SPACE AROUND THE PERIMETER OF THE BUILDING SHALL BE REQUIRED. A MINIMUM STAND OFF DISTANCE OF 82 FEET SHALL BE REQUIRED FROM PARKING AND ROADWAYS.
  4. CONSTRUCT ASPHALT PAVEMENT FOR PARKING LOT EXPANSION.
  5. PERSONNEL GATE SHALL BE INSTALLED WITH A CIPHER LOCK.
  6. CIRCULATION LANES SHALL NOT BE A PART OF THE 45-FOOT WIDE AREA AROUND THE PERIMETER OF THE TEMF.
  7. TIE NEW CONCRETE DRIVEWAY (AS PART OF THIS CONTRACT) TO CONCRETE DRIVE PROVIDED BY OTHERS.
  8. AREA FOR STORM WATER INFILTRATION AND/OR FOR LOW IMPACT DEVELOPMENT (LID) TECHNIQUES FOR STORM WATER RUNOFF. WHERE LID IS USED, COMPLY WITH THE CRITERIA LISTED IN THE RFP SECTION 01 10 00.
  9. PROVIDE EXTERIOR PARKING LOT LIGHTING AS REQUIRED. REFER TO RFP SECTION 01 10 00, PARAGRAPH 6.9.3 FOR ADDITIONAL CRITERIA.
  10. THE ADJACENT, EXISTING, RIGID PAVEMENT THICKNESS IS 7" CONCRETE OVER A 4" AGGREGATE BASE COURSE. REFER TO APPENDIX "FF" FOR DETAILS. DESIGN PROCEDURES SHALL CONFORM TO ALL APPLICABLE CRITERIA IN THE RFP.

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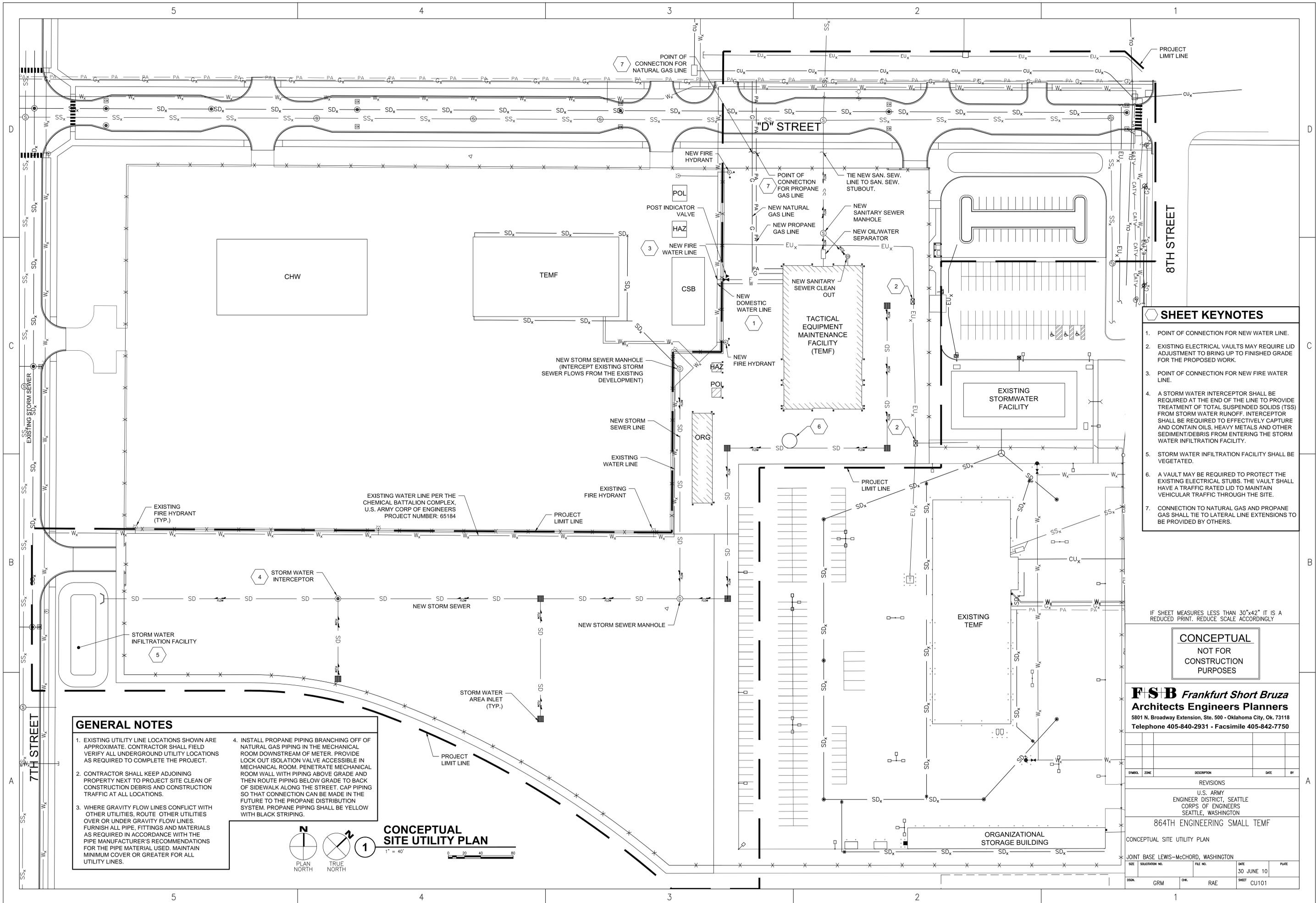
SYMBOL	ZONE	DESCRIPTION	DATE	BY
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ENGINEER DISTRICT, SEATTLE  
CORPS OF ENGINEERS  
SEATTLE, WASHINGTON

864TH ENGINEERING SMALL TEMF

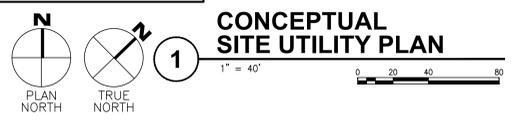
CONCEPTUAL SITE LAYOUT PLAN

JOINT BASE LEWIS-McCHORD, WASHINGTON				
SIZE	SOLUTION NO.	FILE NO.	DATE	PLATE
			30 JUNE 10	
DSGN	GRM	CHK	RAE	SHEET CS101



- SHEET KEYNOTES**
- POINT OF CONNECTION FOR NEW WATER LINE.
  - EXISTING ELECTRICAL VAULTS MAY REQUIRE LID ADJUSTMENT TO BRING UP TO FINISHED GRADE FOR THE PROPOSED WORK.
  - POINT OF CONNECTION FOR NEW FIRE WATER LINE.
  - A STORM WATER INTERCEPTOR SHALL BE REQUIRED AT THE END OF THE LINE TO PROVIDE TREATMENT OF TOTAL SUSPENDED SOLIDS (TSS) FROM STORM WATER RUNOFF. INTERCEPTOR SHALL BE REQUIRED TO EFFECTIVELY CAPTURE AND CONTAIN OILS, HEAVY METALS AND OTHER SEDIMENT/DEBRIS FROM ENTERING THE STORM WATER INFILTRATION FACILITY.
  - STORM WATER INFILTRATION FACILITY SHALL BE VEGETATED.
  - A VAULT MAY BE REQUIRED TO PROTECT THE EXISTING ELECTRICAL STUBS. THE VAULT SHALL HAVE A TRAFFIC RATED LID TO MAINTAIN VEHICULAR TRAFFIC THROUGH THE SITE.
  - CONNECTION TO NATURAL GAS AND PROPANE GAS SHALL TIE TO LATERAL LINE EXTENSIONS TO BE PROVIDED BY OTHERS.

- GENERAL NOTES**
- EXISTING UTILITY LINE LOCATIONS SHOWN ARE APPROXIMATE. CONTRACTOR SHALL FIELD VERIFY ALL UNDERGROUND UTILITY LOCATIONS AS REQUIRED TO COMPLETE THE PROJECT.
  - CONTRACTOR SHALL KEEP ADJOINING PROPERTY NEXT TO PROJECT SITE CLEAN OF CONSTRUCTION DEBRIS AND CONSTRUCTION TRAFFIC AT ALL LOCATIONS.
  - WHERE GRAVITY FLOW LINES CONFLICT WITH OTHER UTILITIES, ROUTE OTHER UTILITIES OVER OR UNDER GRAVITY FLOW LINES. FURNISH ALL PIPE, FITTINGS AND MATERIALS AS REQUIRED IN ACCORDANCE WITH THE PIPE MANUFACTURER'S RECOMMENDATIONS FOR THE PIPE MATERIAL USED. MAINTAIN MINIMUM COVER OR GREATER FOR ALL UTILITY LINES.
  - INSTALL PROPANE PIPING BRANCHING OFF OF NATURAL GAS PIPING IN THE MECHANICAL ROOM DOWNSTREAM OF METER. PROVIDE LOCK OUT ISOLATION VALVE ACCESSIBLE IN MECHANICAL ROOM. PENETRATE MECHANICAL ROOM WALL WITH PIPING ABOVE GRADE AND THEN ROUTE PIPING BELOW GRADE TO BACK OF SIDEWALK ALONG THE STREET. CAP PIPING SO THAT CONNECTION CAN BE MADE IN THE FUTURE TO THE PROPANE DISTRIBUTION SYSTEM. PROPANE PIPING SHALL BE YELLOW WITH BLACK STRIPING.



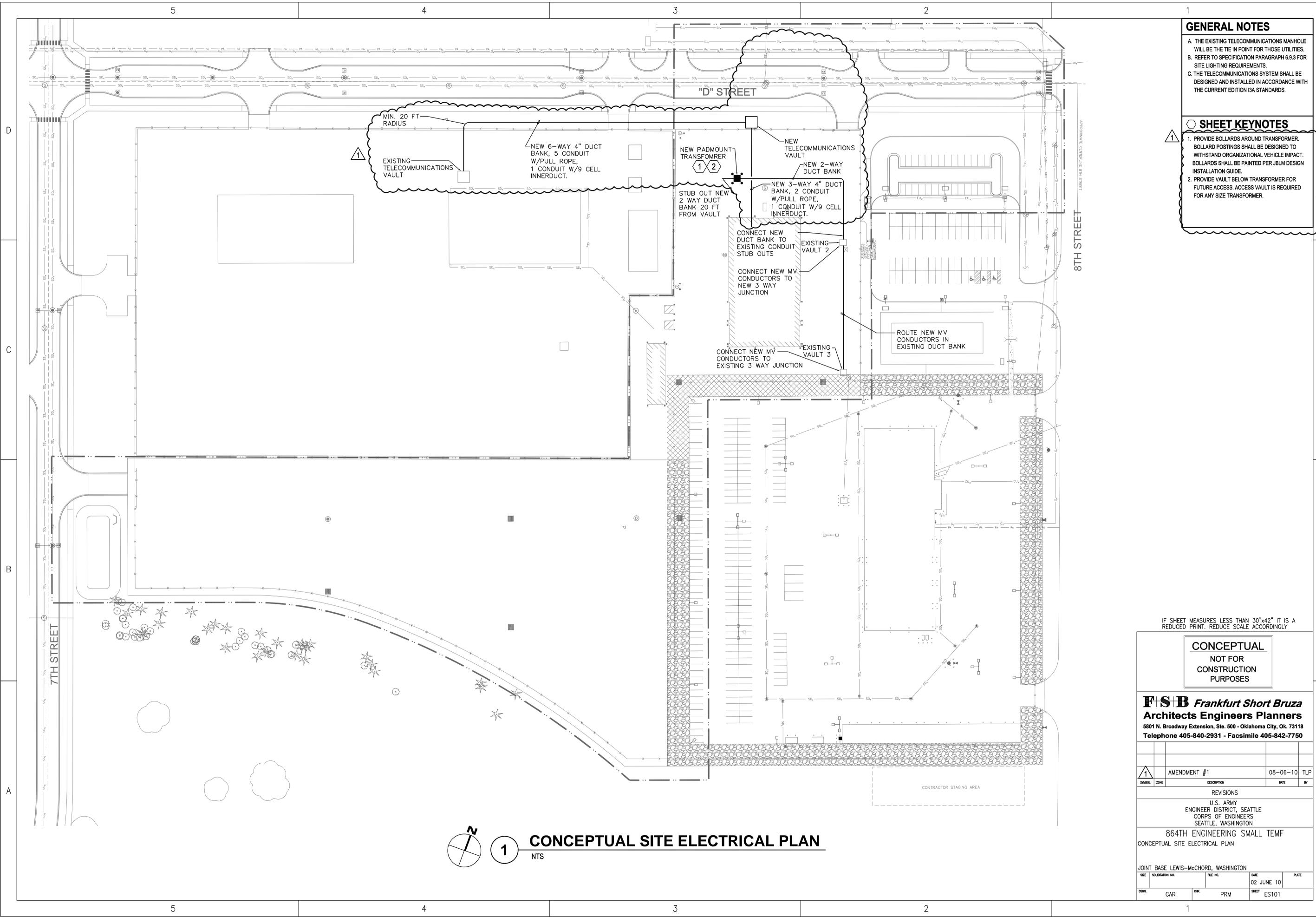
**CONCEPTUAL SITE UTILITY PLAN**

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864TH ENGINEERING SMALL TEMF				
CONCEPTUAL SITE UTILITY PLAN				
JOINT BASE LEWIS-McCHORD, WASHINGTON				
SIZE	SOLUTION NO.	FILE NO.	DATE	PLATE
			30 JUNE 10	
DESIGN	GRM	CHK. RAE	SHEET CU101	



**GENERAL NOTES**

- THE EXISTING TELECOMMUNICATIONS MANHOLE WILL BE THE TIE IN POINT FOR THOSE UTILITIES.
- REFER TO SPECIFICATION PARAGRAPH 6.9.3 FOR SITE LIGHTING REQUIREMENTS.
- THE TELECOMMUNICATIONS SYSTEM SHALL BE DESIGNED AND INSTALLED IN ACCORDANCE WITH THE CURRENT EDITION ISA STANDARDS.

**SHEET KEYNOTES**

- PROVIDE BOLLARDS AROUND TRANSFORMER. BOLLARD POSTINGS SHALL BE DESIGNED TO WITHSTAND ORGANIZATIONAL VEHICLE IMPACT. BOLLARDS SHALL BE PAINTED PER JB/LM DESIGN INSTALLATION GUIDE.
- PROVIDE VAULT BELOW TRANSFORMER FOR FUTURE ACCESS. ACCESS VAULT IS REQUIRED FOR ANY SIZE TRANSFORMER.

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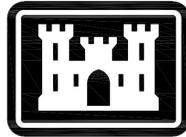
1	AMENDMENT #1	08-06-10	TLP
SYMBOL	ZONE	DESCRIPTION	DATE

REVISIONS  
U.S. ARMY  
ENGINEER DISTRICT, SEATTLE  
CORPS OF ENGINEERS  
SEATTLE, WASHINGTON

864TH ENGINEERING SMALL TEMP  
CONCEPTUAL SITE ELECTRICAL PLAN

JOINT BASE LEWIS-McCHORD, WASHINGTON			
SIZE	SOLUTION NO.	FILE NO.	DATE
OSGN	CAR	CHK	PRM
			SHEET ES101

 **1** **CONCEPTUAL SITE ELECTRICAL PLAN**  
NTS



US Army Corps  
of Engineers  
Seattle District

# 864th Engineering Battalion

## Small Temf

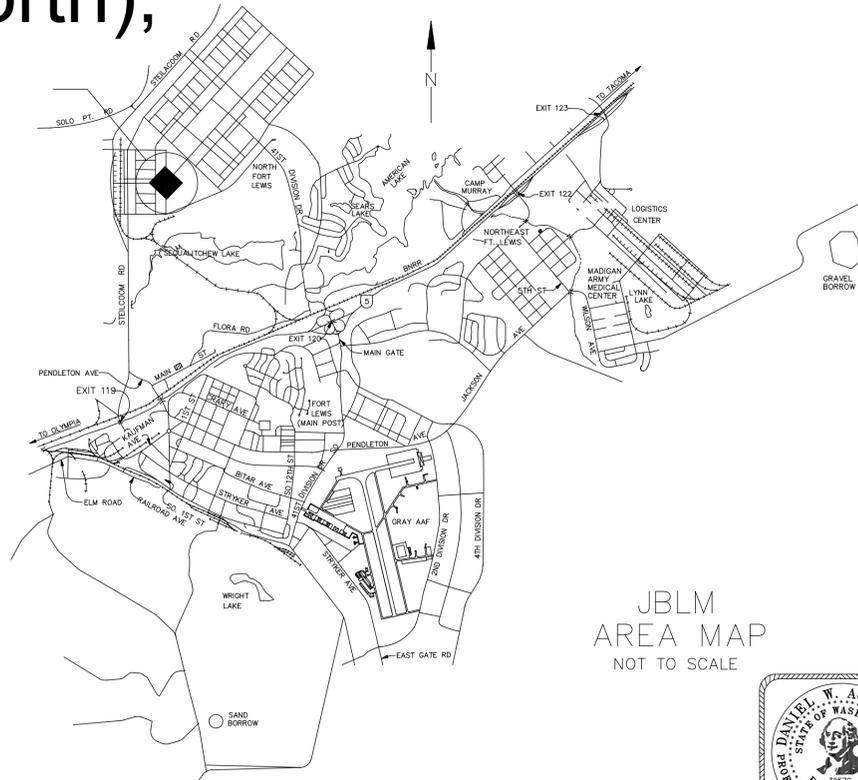
### Topographic Survey

Joint Base Lewis-McChord, Washington

JOB LOCATION (Joint Base Lewis-McChord, North),  
JOB LOCATION (Washington)



JBLM SMALL TEMF SITE



PLAN NORTH

PN 069167

FY 09



US Army Corps  
of Engineers  
Seattle District

File #	Date
Invitation #	

Recommended by (TYPE IN NAME) CHIEF, DESIGN BRANCH	DATE:
Approved by (TYPE IN NAME) ACT'G CH. ENG. AND CONST. DIV.	DATE:

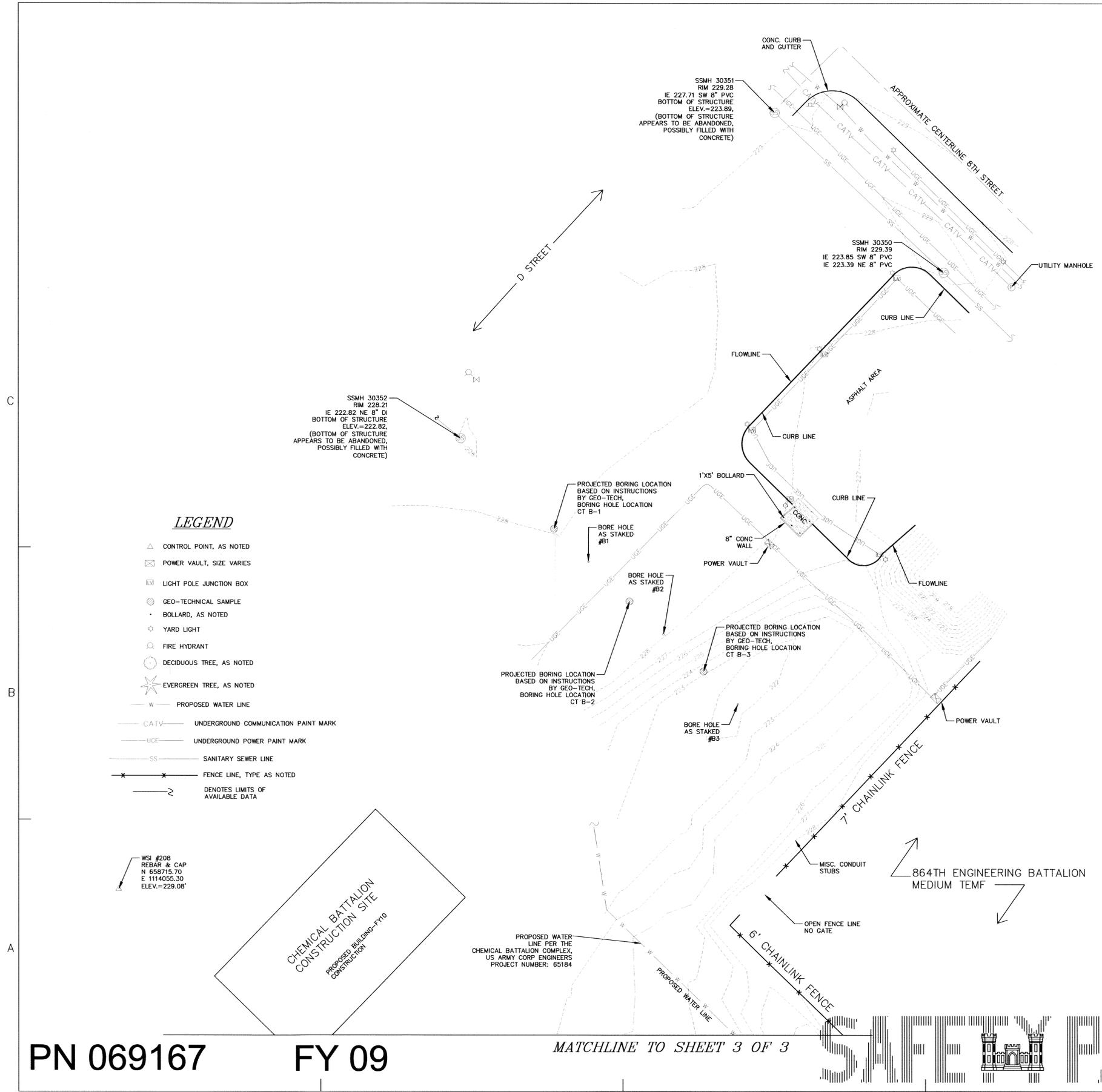
Submitted by DESIGN MANAGER	DATE:
Reviewed by	DATE:

U.S. ARMY ENGINEER DISTRICT, SEATTLE CORPS OF ENGINEERS SEATTLE, WASHINGTON	DATE: 06-14-2010
Prepared by WHITESHIELD, INC.	A/E FIRM NAME

864TH ENG. BATTALION SM. TEMF Topographic Survey	WA
TITLE AND AREA MAPS	PN 069167

Plate number: G-001
Sheet 1 of 3

File: P:\2008-09-01 - Ft. Lewis - Biggs\Drawings\208-038-02-11 FORT-COR-ENG ID. esapken Date: 17-Jun-10 14:20:00



**LEGEND**

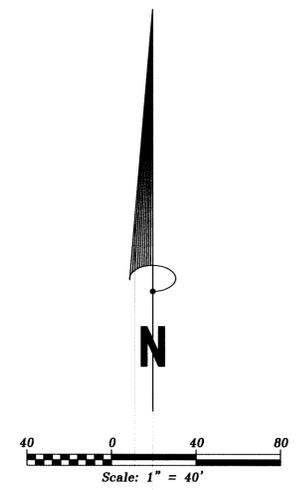
- △ CONTROL POINT, AS NOTED
- ⊠ POWER VAULT, SIZE VARIES
- ⊞ LIGHT POLE JUNCTION BOX
- ⊙ GEO-TECHNICAL SAMPLE
- BOLLARD, AS NOTED
- ☆ YARD LIGHT
- ⊙ FIRE HYDRANT
- ⊙ DECIDUOUS TREE, AS NOTED
- ⊙ EVERGREEN TREE, AS NOTED
- W — PROPOSED WATER LINE
- CATV — UNDERGROUND COMMUNICATION PAINT MARK
- UGE — UNDERGROUND POWER PAINT MARK
- SS — SANITARY SEWER LINE
- X — FENCE LINE, TYPE AS NOTED
- > — DENOTES LIMITS OF AVAILABLE DATA

WSI #208  
REBAR & CAP  
N 658715.70  
E 1114055.30  
ELEV.=229.08'

CHEMICAL BATTALION  
CONSTRUCTION SITE  
PROPOSED BUILDING-F110  
CONSTRUCTION

PROPOSED WATER  
LINE PER THE  
CHEMICAL BATTALION COMPLEX,  
US ARMY CORP ENGINEERS  
PROJECT NUMBER: 65184

MATCHLINE TO SHEET 3 OF 3



**HORIZONTAL DATUM**

NAD 83/91 WASHINGTON STATE PLANE SOUTH ZONE, IN US SURVEY FEET AS PROVIDED BY THE U.S. ARMY CORP OF ENGINEERS, SEATTLE DISTRICT

CONTROL  
ALL POINTS NAD83(91) & ANVD88, IN US SURVEY FEET  
DEA 13  
N 658376.282  
E 11133680.115  
ELEV.=227.49'  
MAG NAIL W/ WASHER  
DEA 12  
N 658968.62  
E 1114243.34  
ELEV.=228.14'  
MAG NAIL W/ WASHER

**VERTICAL DATUM**

NAVD 88 - NORTH AMERICAN VERTICAL DATUM OF 1988, IN US SURVEY FEET AS PROVIDED BY THE U.S. ARMY CORP OF ENGINEERS, SEATTLE DISTRICT

**EQUIPMENT AND PROCEDURES**

SURVEY CONTROL NETWORK ESTABLISHED FROM CONTROL POINTS, TRIMBLE S6 SERIES TOTAL STATIONS (5 ARC SECONDS OR LESS AND 3MM +/- 3 PPM ACCURACY) WERE USED FOR TOPOGRAPHIC MAPPING MEASUREMENTS.

**SURVEYOR'S NOTES**

1. FIELD SURVEY COMPLETED MAY, 2010.
2. PAINT MARKINGS DEFINING THE LOCATIONS OF UNDERGROUND UTILITIES WERE IDENTIFIED BY THE UNDERGROUND LOCATING FIRM OF UTILITY DETECTION SERVICES (UDS) ON APRIL 6, 2010. WHITE SHIELD HAS RELIED UPON THESE MARKINGS AND THEREFORE QUALIFIES THE MAP'S ACCURACY AND COMPLETENESS TO THAT EXTENT. UTILITIES OTHER THAN THOSE SHOWN MAY EXIST ON THE SITE. UNDERGROUND UTILITY LOCATIONS SHOWN HEREON ARE TAKEN FROM A COMPILATION OF PAINT MARKINGS BY A FIRM SPECIALIZING IN UTILITY LOCATES, PUBLIC RECORDS AND VISIBLE FIELD EVIDENCE. WE ASSUME NO LIABILITY FOR THE ACCURACY OF THE PUBLIC RECORDS. UNDERGROUND UTILITY LOCATIONS ARE ONLY APPROXIMATE. UNDERGROUND CONNECTIONS ARE SHOWN AS STRAIGHT LINES BETWEEN VISIBLE SURFACE LOCATIONS BUT MAY CONTAIN BENDS OR CURVES NOT SHOWN. FIELD VERIFICATION IS NECESSARY PRIOR TO OR DURING ANY CONSTRUCTION.
3. ALL DIMENSIONS, MEASUREMENTS, OR COORDINATES ARE IN U.S. SURVEY FEET UNLESS OTHERWISE NOTED.
4. STATE PLANE COORDINATES HAVE BEEN PROJECTED TO A LOCAL PROJECT DATUM USING A MEANED COMBINED SCALE FACTOR OF 0.99995576. THE DISTANCES REPORTED HEREON ARE GROUND DISTANCES.



File #	Date
Invitation #	

Recommended by	
Submitted by	
DESIGN MANAGER	
Reviewed by	

U.S. ARMY ENGINEER DISTRICT SEATTLE CORPS OF ENGINEERS SEATTLE, WASHINGTON	DATE: 06-14-2010
Prepared by	DATE: 06-14-2010
WHITESHIELD INC.	DATE: 06-14-2010
A/E FIRM NAME	DATE: 06-14-2010

U.S. ARMY ENGINEER DISTRICT SEATTLE CORPS OF ENGINEERS SEATTLE, WASHINGTON	DATE: 06-14-2010
Prepared by	DATE: 06-14-2010
WHITESHIELD INC.	DATE: 06-14-2010
A/E FIRM NAME	DATE: 06-14-2010

864TH ENG. BATTALION SMALL TEMF Topographic Survey	WA
TITLE AND AREA MAPS	PN 069167
FT Lewis	PN 069167

Plate number: G-002
Sheet 2 of 3



PN 069167      FY 09

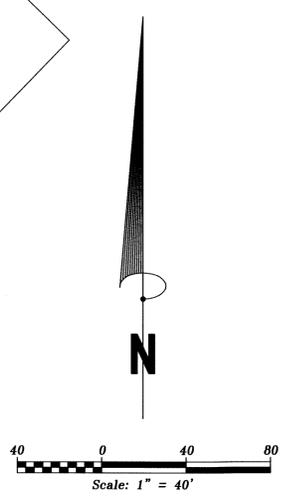


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MATCHLINE TO SHEET 2 OF 3

CHEMICAL BATTALION  
CONSTRUCTION SITE

864TH ENGINEERING BATTALION  
MEDIUM TEMP



TREE LEGEND

PT NO.	DESCRIPTION	DIA.	COMMENT
30413	FIR	44"	
30414	FIR	44"	
30415	FIR	44"	
30416	FIR	36"	
30417	FIR	18"	
30418	FIR	24"	
30419	FIR	44"	
30420	FIR	52"	
30421	FIR	40"	
30465	FIR	12"	
30466	FIR	12"	
30467	FIR	12"	
30468	FIR	12"	
30469	FIR	6"	
30470	FIR	12"	
30471	FIR	54"	
30472	MADRONA	6"	
30473	MADRONA	8"	
30474	MADRONA	10"	
30475	MADRONA	12"	
30476	MADRONA	12"	
30477	MADRONA	8"	
30478	MADRONA	12"	
30479	MADRONA	4"	
30480	MADRONA	6"	
30481	MADRONA	12"	
30482	MADRONA	12"	
30483	FIR	28"	
30484	FIR	8"	
30485	FIR	12"	
30486	FIR	42"	
30487	FIR	42"	
30488	FIR	42"	
30489	FIR	30"	
30490	FIR	24"	
30491	MADRONA	12"	
30492	MADRONA	12"	
30493	MADRONA	12"	
30494	MADRONA	12"	
30495	MADRONA	14"	
30496	MADRONA	15"	
30497	MADRONA	8"	
30498	MADRONA	8"	
30499	MADRONA	8"	
30500	MADRONA	8"	
30501	MADRONA	12"	
30502	MADRONA	10"	
30503	MADRONA	8"	
30504	MADRONA	12"	
30505	MADRONA	14"	
30506	MADRONA	4"	GROUP CLUSTER
30507	MADRONA	12"	
30508	MADRONA	6"	
30509	MADRONA	6"	
30510	MADRONA	8"	
30511	MADRONA	8"	
30512	MADRONA	10"	
30513	MADRONA	10"	
30514	FIR	10"	
30515	FIR	52"	
30516	FIR	60"	
30517	FIR	12"	
30518	FIR	13"	
30519	FIR	12"	
30520	FIR	12"	

LEGEND

- △ CONTROL POINT, AS NOTED
- ⊠ POWER VAULT, SIZE VARIES
- ⊞ LIGHT POLE JUNCTION BOX
- ⊙ GEO-TECHNICAL SAMPLE
- BOLLARD, AS NOTED
- ⊙ YARD LIGHT
- ⊙ FIRE HYDRANT
- DECIDUOUS TREE, AS NOTED
- ★ EVERGREEN TREE, AS NOTED
- W — PROPOSED WATER LINE
- CATV — UNDERGROUND COMMUNICATION PAINT MARK
- UGE — UNDERGROUND POWER PAINT MARK
- SS — SANITARY SEWER LINE
- X — X — FENCE LINE, TYPE AS NOTED
- > — DENOTES LIMITS OF AVAILABLE DATA

PROPOSED WATER LINE PER THE CHEMICAL BATTALION COMPLEX, US ARMY CORP. ENGINEERS. PROJECT NUMBER: 65184

CURRENT GROUND CONDITIONS ARE TO SUB-GRADE, NOT FINAL GRADE, BECAUSE OF ACTIVE CONSTRUCTION IN THE ADJACENT PROPERTY IS CURRENTLY USING THIS PROPERTY AS A STORAGE AREA FOR SPOIL PILES OF MATERIAL.

WSI #204  
REBAR & CAP  
N 658499.93  
E 1114629.76  
ELEV.=228.71'

BORING HOLE #B4

FOUND MONUMENT, BLUEDOT CONTROL POINT NO. 110

EDGE OF CURRENT CONSTRUCTION

GRAVEL CONSTRUCTION ACCESS ROAD

GRAVEL CONSTRUCTION ACCESS ROAD

EDGE OF CURRENT CONSTRUCTION

BORING HOLE #B5

SILT FENCE



File # \_\_\_\_\_

Invitation # \_\_\_\_\_

Date \_\_\_\_\_

Recommended by \_\_\_\_\_

CHIEF, DESIGN BRANCH

Approved by \_\_\_\_\_

Submitted by \_\_\_\_\_

DESIGN MANAGER

Reviewed by \_\_\_\_\_

U.S. ARMY ENGINEER DISTRICT SEATTLE  
CORPS OF ENGINEERS  
SEATTLE, WASHINGTON

Prepared by \_\_\_\_\_

WHITESHIELD, INC. 06-14-2010  
DATE: \_\_\_\_\_

CH. TECH. ENG. AND REVIEW SEC. DATE: \_\_\_\_\_

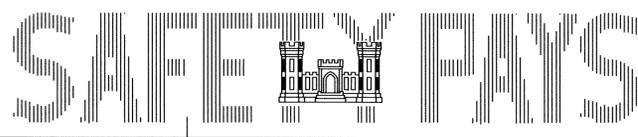
864TH ENG. BATTALION SMALL TEMP  
Topographic Survey

TITLE AND  
AREA MAPS

FT. Lewis PN 069167 WA

Plate number:  
G-003

Sheet 3 of 3



PN 069167

FY 09

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REQUEST FOR PROPOSAL W912DW-09-T-5400

**864<sup>TH</sup> ENGINEERING BATTALION SMALL TACTICAL  
EQUIPMENT MAINTENANCE FACILITIES (TEMF)**

**PN 069167, FY 2009**

JOINT BASE LEWIS-McCHORD, WASHINGTON

Appendix K: Utility Cost Information

**APPENDIX K**  
**Life Cycle Cost Analysis Fuel Cost Information**  
**(REV 1.1, 28 Mar 2008)**

The following utility rates for this installation are provided for the purpose of performing life cycle cost calculations in response to this solicitation and for design development in accordance with Section 01 33 16 Design After Award:

**Electrical:**

Demand Charge - \$3.61 per kilowatt

Energy Charge - \$ 0.030389 per kilowatt-hour (at Substation)

Blended Rate - \$ 0.03684 per kilowatt-hour (blended annual energy and demand cost)  
(this rate includes a delivery charge)

**Natural Gas:**

Commodity Charge Rate - \$ 1.24 per therm

Commodity Charge Rate - \$ 0.91 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 - \$1.296 per thousand gallons

**Sewer:**

Commodity Charge Rate - \$2.2707 per thousand gallons

**Purchased/Central Steam:**

Not Applicable to this project

**Purchased High Temperature Water:**

Not Applicable to this project

**Purchased Chilled Water:**

Not Applicable to this project

**APPENDIX L**

**LEED Project Credit Guidance (MAY 10)**

This spreadsheet indicates Army required credits, Army preferred credits, project-specific ranking of individual point preferences, assumptions guidance for individual credits, and references to related language in the RFP for individual credits.

LEED Credit Paragraph	LEED Project Credit Guidance	Army Guidance: Required - Preferred - Avoid		Project Preference Ranking: (1=most preferred, blank=no preference, X=preference not applicable to this credit, Rqd=required)
PAR	FEATURE			REMARKS
<b>SUSTAINABLE SITES</b>				
SSPR1	Construction Activity Pollution Prevention (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met.
SS1	Site Selection		X	See paragraph LEED CREDITS COORDINATION.

SS2	Development Density & Community Connectivity - OPTION 1 DENSITY		X	See paragraph LEED CREDITS COORDINATION.
	Development Density & Community Connectivity - OPTION 2 CONNECTIVITY		X	See paragraph LEED CREDITS COORDINATION.
SS3	Brownfield Redevelopment		X	See paragraph LEED CREDITS COORDINATION.
SS4.1	Alternative Transportation: Public Transportation Access		X	See paragraph LEED CREDITS COORDINATION.
SS4.2	Alternative Transportation: Bicycle Storage & Changing Rooms	Pref		Assume that non-transient building occupants are NOT housed on Post unless indicated otherwise.
SS4.3	Alternative Transportation: Low Emitting & Fuel Efficient Vehicles - OPTION 1			Requires provision of vehicles, which cannot be purchased with construction funds. Assume Government will not provide vehicles unless indicated otherwise. Assume that 50% of GOV fleet is NOT alternative fuel vehicles unless indicated otherwise.
SS4.3	Alternative Transportation: Low Emitting & Fuel Efficient Vehicles - OPTION 2	Pref		
SS4.3	Alternative Transportation: Low Emitting & Fuel Efficient Vehicles - OPTION 3			Requires provision of vehicle refueling stations. Installation must support type of fuel and commit to maintaining/supporting refueling stations.
SS4.4	Alternative Transportation: Parking Capacity	Pref		

SS5.1	Site Development: Protect or Restore Habitat			
SS5.2	Site Development: Maximize Open Space	Pref		Assume AGMBC option for aggregated open space at another location on the installation is not available to the project unless indicated otherwise.
SS6.1	Stormwater Design: Quantity Control	Pref		See paragraph STORMWATER MANAGEMENT.
SS6.2	Stormwater Design: Quality Control	Pref		See paragraph STORMWATER MANAGEMENT.
SS7.1	Heat Island Effect: Non-Roof			
SS7.2	Heat Island Effect: Roof	Pref		Coordinate with nearby airfield requirements, which may preclude this credit.
SS8	Light Pollution Reduction	Pref		
<b><u>WATER EFFICIENCY</u></b>				
WEPR1	Water Use Reduction (Version 3 only)	Rqd	Rqd	All LEED prerequisites are required to be met.
WE1.1	Water Efficient Landscaping: Reduce by 50%	Pref		See paragraph IRRIGATION. Project must include landscaping to be eligible for this credit.
WE1.2	Water Efficient Landscaping: No Potable Water Use or No Irrigation	Pref		Project must include landscaping to be eligible for this credit.
WE2	Innovative Wastewater Technologies - OPTION 1			
WE2	Innovative Wastewater Technologies - OPTION 2			
WE3	Water Use Reduction	Pref		See paragraph BUILDING WATER USE REDUCTION.

<b>ENERGY AND ATMOSPHERE</b>				
EAPR1	Fundamental Commissioning of the Building Energy Systems (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met.
EAPR2	Minimum Energy Performance (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met.
EAPR3	Fundamental Refrigerant Management (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met.
EA1	Optimize Energy Performance	Rqd	1	Earning of LEED EA1 points as indicated in paragraph <b>ENERGY CONSERVATION</b> , as a minimum, is required.
EA2.1	On-Site Renewable Energy	Pref		See paragraph <b>ENERGY CONSERVATION</b> .
EA3	Enhanced Commissioning	Rqd		See paragraph <b>COMMISSIONING</b> . The Commissioning Authority may be provided through the Design-Build Contractor only if in accordance with USGBC Credit Interpretation Ruling (CIR) dated 9/15/06. Commissioning Authority activities begin during design phase and continue well beyond beneficial occupancy. Assume Government will not provide CxA post-occupancy activities unless indicated otherwise.
EA4	Enhanced Refrigerant Management			
EA5	Measurement & Verification			Assume Government will not provide post-occupancy activities unless indicated otherwise.
EA6	Green Power		X	See paragraph <b>LEED CREDITS COORDINATION</b> .

<b>MATERIALS AND RESOURCES</b>				
MRPR1	Storage & Collection of Recyclables (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met. Coordinate with Installation during design development on collection service and receptacles.
MR1	Building Reuse			
MR2.1	Construction Waste Management: Divert 50% From Disposal	Pref		See paragraph CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT.
MR2.2	Construction Waste Management: Divert 75% From Disposal	Pref		
MR3	Materials Reuse			
MR4.1	Recycled Content: 10% (post- consumer + 1/2 pre-consumer)	Pref		See paragraph RECYCLED CONTENT.
MR4.2	Recycled Content: 20% (post- consumer + 1/2 pre-consumer)	Pref		
MR5.1	Regional Materials:10% Extracted, Processed & Manufactured Regionally			
MR5.2	Regional Materials:20% Extracted, Processed & Manufactured Regionally			

MR6	Rapidly Renewable Materials	Pref		See paragraph BIOBASED AND ENVIRONMENTALLY PREFERABLE MATERIALS and paragraph FEDERAL BIOBASED PRODUCTS PREFERRED PROCUREMENT PROGRAM.
MR7	Certified Wood	Pref		See paragraph BIOBASED AND ENVIRONMENTALLY PREFERABLE MATERIALS.
<b><u>INDOOR ENVIRONMENTAL QUALITY</u></b>				
EQPR1	Minimum IAQ Performance (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met.
EQPR2	Environmental Tobacco Smoke (ETS) Control (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met. Assume all buildings are smoke free unless indicated otherwise (family housing, barracks and other lodging are facility types where smoking may be permitted in some cases).
EQ1	Outdoor Air Delivery Monitoring			
EQ2	Increased Ventilation			
EQ3.1	Construction IAQ Management Plan: During Construction	Pref		See paragraph CONSTRUCTION IAQ MANAGEMENT.
EQ3.2	Construction IAQ Management Plan: Before Occupancy	Pref		See paragraph CONSTRUCTION IAQ MANAGEMENT.
EQ4.1	Low Emitting Materials: Adhesives & Sealants	Pref		See paragraph LOW-EMITTING MATERIALS.
EQ4.2	Low Emitting Materials: Paints & Coatings	Pref		See paragraph LOW-EMITTING MATERIALS.
EQ4.3	Low Emitting Materials: Carpet/Flooring Systems	Pref		See paragraph LOW-EMITTING MATERIALS.

EQ4.4	Low Emitting Materials: Composite Wood & Agrifiber Products	Pref		See paragraph LOW-EMITTING MATERIALS.
EQ5	Indoor Chemical & Pollutant Source Control	Pref		System requiring weekly cleaning to earn this credit is not a permitted option unless indicated otherwise.
EQ6.1	Controllability of Systems: Lighting			
EQ6.2	Controllability of Systems: Thermal Comfort			
EQ7.1	Thermal Comfort: Design	Rqd		See paragraph HEATING, VENTILATING AND AIR CONDITIONING.
EQ7.2	Thermal Comfort: Verification			Project must earn credit EQ7.1 to be eligible for this credit. Assume Government will not provide post-occupancy activities unless indicated otherwise.
EQ8.1	Daylight & Views: Daylight 75% of Spaces	Pref		See paragraph DAYLIGHTING.
EQ8.2	Daylight & Views: Views for 90% of Spaces	Pref		
<b>INNOVATION &amp; DESIGN PROCESS</b>				
IDc1.1	Innovation in Design			See paragraph INNOVATION AND DESIGN CREDITS. Assume Government will not provide any activities associated with ID credits.
IDc1.2	Innovation in Design			
IDc1.3	Innovation in Design			
IDc1.4	Innovation in Design			
IDc2	LEED Accredited Professional	Rqd	Rqd	LEED AP during design and construction is required.
<b>REGIONAL PRIORITY CREDITS (Version 3 only)</b>				See paragraph LEED CREDITS COORDINATION.

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REQUEST FOR PROPOSAL W912DW-09-T-5400

**864<sup>th</sup> ENGINEERING BATTALION SMALL TACTICAL  
EQUIPMENT MAINTENANCE FACILITIES (TEMF)**

**PN 069167, FY 2009**

JOINT BASE LEWIS-McCHORD, WASHINGTON

Appendix M: LEED Owner's Project Requirements

2 OCT 07

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# Owner's Project Requirements Document for LEED Fundamental Commissioning

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Project: Army Standard Design Tactical Equipment Maintenance Facility (TEMF)

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Approved: \_\_\_\_\_

Name	Owner's Representative	Date
_____	_____	_____
Name	Design Agent's Representative	Date
_____	_____	_____

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## 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 Version 2.2 EA Prerequisite 1, 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.

Use of this template is not required, nor are there any restrictions on editing of it. It is provided simply as a tool to assist project teams in meeting the documentation requirements for LEED Fundamental Commissioning. The intent of the Owner's Project Requirements Document, per the LEED v2.2 Reference Guide, 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 v2.2 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.

2 OCT 07

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.

2 OCT 07

## 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

2 OCT 07

**1. Owner and User Requirements**

What is the primary purpose, program and use of this project? (example: office building with data center)

Tactical equipment maintenance and repair facility.

Describe pertinent project history. (example: standard design development)

Current standard was developed in 2004 and revised in 2006. The intended design is based on standard repair bays and support functions that are based on unit composition, mission, size and equipment.

**Broad Goals**

What are the broad goals relative to program needs?

To provide economical, standardized facilities that meet the basic functional needs of units.

What are the broad goals relative to future expansion?

Future expansion is not a feature of the TEMF standard.

What are the broad goals relative to flexibility?

The goal is to allow ready adaptability in response to changes in force structure, equipment, and doctrine.

What are the broad goals relative to quality of materials?

Similar to a representative facility of the same type in the private sector. 25-year life with normal maintenance.

What are the broad goals relative to construction costs?

Facility must meet budget.

What are the broad goals relative to operational costs?

Meet EPACT (reduced water, energy consumption). Minimize operating costs as much as possible within first cost budget.

Other broad goals: *(Insert as applicable)*

To provide essentially the same functional facility components at all locations (site-adapt) to the extent possible to facilitate unit mobility and to reduce repetitive design costs.

2 OCT 07

To reduce construction time to 18 months. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**2. Environmental and Sustainability Goals**

What are the project goals relative to sustainability and environmental issues? (example: LEED Silver rating)

LEED Silver rating \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

What are the project goals relative to energy efficiency? (example: Meet EPACT)

Meet EPACT \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

What are the project goals and requirements for building siting that will impact energy use?

Same facility must be site-adapted worldwide. Consistent building orientation cannot be expected. Variations in availability of fuel sources. Requirement for adjacent hardstand will effect opportunities for shading.  
Special local requirements are indicated in Paragraph 6 of Statement of Work.  
\_\_\_\_\_

What are the project goals and requirements for building facade that will impact energy use?

Same facility must be site-adapted worldwide. Exterior appearance will vary to be compatible with adjoining environment's architectural theme.  
Special local requirements are indicated in Paragraph 6 of Statement of Work.  
\_\_\_\_\_

What are the project goals and requirements for building fenestration that will impact energy use?

Same facility must be site-adapted worldwide. Antiterrorism/Force Protection criteria (UFC 4-010-01) requires laminated glass and heavy duty frame.  
\_\_\_\_\_  
\_\_\_\_\_

What are the project goals and requirements for building envelope that will impact energy use?

ASHRAE 90.1 and EPACT are required.  
Special local requirements are indicated in Paragraph 6 of Statement of Work.  
\_\_\_\_\_

What are the project goals and requirements for building roof that will impact energy use?

Special local requirements are indicated in Paragraph 6 of Statement of Work.  
\_\_\_\_\_

Other: *(Insert as applicable)*

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\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**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.

Typical occupancy schedule is normal business work day. Extended work day and weekend work is anticipated for entire facility during preparation for deployment only.

\_\_\_\_\_  
\_\_\_\_\_

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.

Supervised monitoring of building. IDS at COMSEC vaults, arms vault and SIPRNet room. Maintenance and repair areas, office areas have automatic lighting controls with manual override as necessary. Automatic controls shall consist of an automatic time clock and/or occupancy sensors.

\_\_\_\_\_  
\_\_\_\_\_

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: IESNA Lighting Handbook, IESNA RP-1-04, ASHRAE 90.1

Temperature: See Table 5-1 in Statement of Work of RFP

Humidity: 50%

Air Quality: ASHRAE 62.1

Ventilation: ASHRAE 62.1

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.

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As indicated in Statement of Work.. \_\_\_\_\_  
\_\_\_\_\_

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: IESNA Lighting Handbook, IESNA RP-1-04, ASHRAE 90.1 and as indicated in Statement of Work.

Temperature: None \_\_\_\_\_

Humidity: None \_\_\_\_\_

Air Quality: None \_\_\_\_\_

Ventilation: None \_\_\_\_\_

What, if any, specific types of lighting are desired? (example: fluorescent in 2x2 grid, accent lighting, particular lamps)

As indicated in Statement of Work. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**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: Per Statement of Work \_\_\_\_\_

Quality: \_\_\_\_\_

Preferred Manufacturer: \_\_\_\_\_

Reliability: \_\_\_\_\_

Automation: \_\_\_\_\_

Flexibility: \_\_\_\_\_

Maintenance Requirements: \_\_\_\_\_

Efficiency Target: \_\_\_\_\_

Desired Technologies: \_\_\_\_\_

Indicate desired features for the following commissioned system: Ventilation

Desired Type: Per Statement of Work \_\_\_\_\_

Quality: \_\_\_\_\_

Preferred Manufacturer: \_\_\_\_\_

Reliability: \_\_\_\_\_

Automation: \_\_\_\_\_

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Flexibility: \_\_\_\_\_  
 Maintenance Requirements: \_\_\_\_\_  
 Efficiency Target: \_\_\_\_\_  
 Desired Technologies: \_\_\_\_\_

Indicate desired features for the following commissioned system: Air Conditioning

Desired Type: Per Statement of Work \_\_\_\_\_  
 Quality: \_\_\_\_\_  
 Preferred Manufacturer: \_\_\_\_\_  
 Reliability: \_\_\_\_\_  
 Automation: \_\_\_\_\_  
 Flexibility: \_\_\_\_\_  
 Maintenance Requirements: \_\_\_\_\_  
 Efficiency Target: \_\_\_\_\_  
 Desired Technologies: \_\_\_\_\_

Indicate desired features for the following commissioned system: Refrigeration

Desired Type: Per Statement of Work \_\_\_\_\_  
 Quality: \_\_\_\_\_  
 Preferred Manufacturer: \_\_\_\_\_  
 Reliability: \_\_\_\_\_  
 Automation: \_\_\_\_\_  
 Flexibility: \_\_\_\_\_  
 Maintenance Requirements: \_\_\_\_\_  
 Efficiency Target: \_\_\_\_\_  
 Desired Technologies: \_\_\_\_\_

Indicate desired features for the following commissioned system: HVAC Controls

Desired Type: Per Statement of Work \_\_\_\_\_  
 Quality: \_\_\_\_\_  
 Preferred Manufacturer: \_\_\_\_\_  
 Reliability: \_\_\_\_\_  
 Automation: \_\_\_\_\_  
 Flexibility: \_\_\_\_\_  
 Maintenance Requirements: \_\_\_\_\_  
 Efficiency Target: \_\_\_\_\_  
 Desired Technologies: \_\_\_\_\_

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Indicate desired features for the following commissioned system: Domestic Hot Water

Desired Type: Per Statement of Work \_\_\_\_\_

Quality: \_\_\_\_\_

Preferred Manufacturer: \_\_\_\_\_

Reliability: \_\_\_\_\_

Automation: \_\_\_\_\_

Flexibility: \_\_\_\_\_

Maintenance Requirements: \_\_\_\_\_

Efficiency Target: \_\_\_\_\_

Desired Technologies: \_\_\_\_\_

Indicate desired features for the following commissioned system: Lighting Controls

Desired Type: As indicated in Statement of Work.

Quality: None identified.

Preferred Manufacturer: None identified.

Reliability: None identified.

Automation: As indicated in Statement of Work.

Flexibility: None identified.

Maintenance Requirements: None identified.

Efficiency Target: None identified.

Desired Technologies: As indicated in Statement of Work.

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: N/A \_\_\_\_\_

Quality: \_\_\_\_\_

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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?

Varies. DPW Contractor or staff. \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Will the facility be connected to an EMCS? If so, what are the interface requirements? (example: monitoring points, control points, scheduling)

Varies. See Statement of Work. \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

What is the desired level of training and orientation for building occupants to understand and use the building systems?

Minimal for occupants. Per RFP. \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

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What is the desired level of training and orientation for O&M staff to understand and maintain the building systems?

As indicated in Section CONSTRUCTION CLOSEOUT and Statement of Work. \_\_\_\_\_

\_\_\_\_\_

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REQUEST FOR PROPOSAL W912DW-09-T-5400

**864<sup>TH</sup> ENGINEERING BATTALION SMALL TACTICAL  
EQUIPMENT MAINTENANCE FACILITIES (TEMF)**

**PN 069167, FY 2009**

JOINT BASE LEWIS-McCHORD, WASHINGTON

Appendix N: LEED Requirements for Multiple  
Contractor Combined Projects

APPENDIX N  
LEED Requirements for Multiple Contractor Combined Projects

Not Used

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REQUEST FOR PROPOSAL W912DW-09-T-5400

**864<sup>TH</sup> ENGINEERING BATTALION SMALL TACTICAL  
EQUIPMENT MAINTENANCE FACILITIES (TEMF)**

**PN 069167, FY 2009**

JOINT BASE LEWIS-McCHORD, WASHINGTON

Appendix O: LEED Strategy Tables

LEED Credit Paragraph	<b>LEED 2.2 Strategy Table</b>	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.
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**BUILDING: TACTICAL EQUIPMENT MAINTENANCE FACILITIES**

PAR	FEATURE		REMARKS
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**CATEGORY 1 – SUSTAINABLE SITES**

SSPR1	Construction Activity Pollution Prevention (PREREQUISITE)	R	Prepare a Storm Water Pollution Prevention Plan (SWPPP) in accordance with the Washington State Department of Ecology (WDOE)
SS1	Site Selection	1	Site is not on a restrictive land type and does not have sensitive site elements that impedes the achievement of this credit
SS2	Development Density & Community Connectivity		Facility not located in or near a dense development to achieve this credit
SS3	Brownfield Redevelopment		Site is not designated as a brownfield site
SS4.1	Alternative Transportation: Public Transportation Access		No public transportation available on Ft. Lewis
SS4.2	Alternative Transportation: Bicycle Storage & Changing Rooms	1	The facility with require showers (for 0.5% of occupants) and bike racks (for 15% of occupants) to achieve this credit
SS4.3	Alternative Transportation: Low Emitting & Fuel Efficient Vehicles - OPTION 1		
SS4.3	Alternative Transportation: Low Emitting & Fuel Efficient Vehicles - OPTION 2	1	Provide preferred parking for low-emitting and fuel-efficient vehicles for 5% of the total vehicle parking capacity being provided for this facility
SS4.3	Alternative Transportation: Low Emitting & Fuel Efficient Vehicles - OPTION 3		
SS4.4	Alternative Transportation: Parking Capacity	1	Provide preferred parking for carpools for 5% of the total vehicle parking capacity being provided for this facility
SS5.1	Site Development: Protect or Restore Habitat		
SS5.2	Site Development: Maximize Open Space		
SS6.1	Stormwater Design: Quantity Control	1	It is probable that the credit may be achieved. Design alternatives should be considered during Stormwater Design.
SS6.2	Stormwater Design: Quality Control	1	It is probable that the credit may be achieved. Design alternatives should be considered during Stormwater Design.
SS7.1	Heat Island Effect: Non-Roof		
SS7.2	Heat Island Effect: Roof		
SS8	Light Pollution Reduction	1	Minimize light trespass from the building and site

**CATEGORY 2 – WATER EFFICIENCY**

WE1.1	Water Efficient Landscaping: Reduce by 50%	1	Design landscaping for the site with native/adapted plants to reduce irrigation requirements
WE1.2	Water Efficient Landscaping: No Potable Water Use or No Irrigation	1	It is probable that the credit may be achieved by designing site landscaping that will not require any irrigation.
WE2	Innovative Wastewater Technologies - OPTION 1		
WE2	Innovative Wastewater Technologies - OPTION 2		
WE3.1	Water Use Reduction: 20% Reduction	1	(See remarks below for WE3.2)
WE3.2	Water Use Reduction: 30% Reduction	1	Building design should employ strategies that in aggregate use 30% less water than the water use baseline calculated for the building (not including irrigation) after meeting the Energy Policy Act of 1992 fixture performance requirements, by using high-efficiency fixtures with occupant sensors on water closets, urinals, and lavatory faucets .

**CATEGORY 3 – ENERGY AND ATMOSPHERE**

LEED Credit Paragraph	<b>LEED 2.2 Strategy Table</b>	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.
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**BUILDING: TACTICAL EQUIPMENT MAINTENANCE FACILITIES**

PAR	FEATURE		REMARKS
EAPR1	Fundamental Commissioning of the Building Energy Systems (PREREQUISITE)	R	Mandatory commissioning of the HVAC systems and associated controls, lighting and daylighting controls, domestic hot water systems, and any renewable energy systems (wind, solar, etc.)
EAPR2	Minimum Energy Performance (PREREQUISITE)	R	Mandatory compliance with both the mandatory provisions (Sections 5.4, 6.4, 7.4, 8.4, 9.4 and 10.4) and the prescriptive requirements (Sections 5.5, 6.5, 7.5 and 9.5) or performance requirements (Section 11) of ASHRAE/IESNA Standard 90.1-2004 (without amendments).
EAPR3	Fundamental Refrigerant Management (PREREQUISITE)	R	Zero use of Class I Ozone-depleting refrigerants in new base building HVAC&R systems: <a href="http://www.epa.gov/ozone/science/ods/classone.html">http://www.epa.gov/ozone/science/ods/classone.html</a> . See EA4 below for further restrictions.
EA1	Optimize Energy Performance	6	EPA Act 2005 mandates a minimum 30% energy efficiency improvement over that required by ASHRAE/IESNA Standard 90.1-2004. A 30% or better improvement will achieve at least 6 points on this Credit.
EA2	On-Site Renewable Energy		
EA3	Enhanced Commissioning		
EA4	Enhanced Refrigerant Management	1	Install base building level HVAC and refrigeration equipment that do not contain HCFCs: <a href="http://www.epa.gov/ozone/science/ods/classtwo.html">http://www.epa.gov/ozone/science/ods/classtwo.html</a>
EA5	Measurement & Verification		
EA6	Green Power		

**CATEGORY 4 – MATERIALS AND RESOURCES**

MRPR1	Storage & Collection of Recyclables (PREREQUISITE)	R	Provide an easily accessible area that serves the entire building and is dedicated to the separation, collection and storage of materials for recycling including (at a minimum) paper, corrugated cardboard, glass, plastics and metals.
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	Recycle and/or salvage at least 50% of non-hazardous construction and demolition debris. Develop and implement a construction waste management plan that, at a minimum, identifies the materials to be diverted from disposal and whether the materials will be sorted on-site or co-mingled. Excavated soil and land-clearing debris do not contribute to this credit. Calculations can be done by weight or volume, but must be consistent throughout.
MR2.2	Construction Waste Management: Divert 75% From Disposal		
MR3.1	Materials Reuse: 5%		
MR3.2	Materials Reuse: 10%		

LEED Credit Paragraph	<b>LEED 2.2 Strategy Table</b>	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.
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**BUILDING: TACTICAL EQUIPMENT MAINTENANCE FACILITIES**

PAR	FEATURE		REMARKS
MR4.1	Recycled Content: 10% (post-consumer + 1/2 pre-consumer)	1	It is probable that the credit may be achieved. The design and construction team should verify availability of materials containing recycled content.
MR4.2	Recycled Content: 20% (post-consumer + 1/2 pre-consumer)		
MR5.1	Regional Materials:10% Extracted, Processed & Manufactured Regionally	1	It is probable that the credit may be achieved. The construction team should verify availability of materials which are extracted/harvested and manufactured locally within 500 miles of the site.
MR5.2	Regional Materials:20% Extracted, Processed & Manufactured Regionally		
MR6	Rapidly Renewable Materials		
MR7	Certified Wood	1	Use a minimum of 50% of wood-based materials and products, certified in accordance with the Forest Stewardship Council's Principles and Criteria, for wood building components

**CATEGORY 5 – INDOOR ENVIRONMENTAL QUALITY**

EQPR1	Minimum IAQ Performance (PREREQUISITE)	R	Mandatory compliance with Sections 4 through 7 of ASHRAE 62.1-2004, Ventilation for Acceptable Indoor Air Quality. Mechanical ventilation systems shall be designed using the Ventilation Rate Procedure.
EQPR2	Environmental Tobacco Smoke (ETS) Control (PREREQUISITE)	R	Smoking will be prohibited in the building and any exterior designated smoking areas shall be at least 25 feet away from entries and outdoor air intakes.
EQ1	Outdoor Air Delivery Monitoring	1	Monitor carbon dioxide concentrations within all densely occupied spaces (those with a design occupant density greater than or equal to 25 people per 1000 sq.ft.). For each mechanical ventilation system serving non-densely occupied spaces, provide a direct outdoor airflow measurement device capable of measuring the minimum outdoor airflow rate with an accuracy of plus or minus 15% of the design minimum outdoor air rate, as defined by ASHRAE 62.1-2004.
EQ2	Increased Ventilation		
EQ3.1	Construction IAQ Management Plan: During Construction	1	Develop and implement an Indoor Air Quality (IAQ) Management Plan for the construction and pre-occupancy phases of the building as follows: 1) During construction meet or exceed the recommended Control Measures of SMACNA IAQ Guidelines for Occupied Buildings under Construction, 1995, Chapter 3; 2) Protect stored on-site and installed absorptive materials from moisture damage; and 3) Use MERV 8 filtration media at each return air grille, as determined by ASHRAE 52.2-1999.
EQ3.2	Construction IAQ Management Plan: Before Occupancy	1	Develop and implement an Indoor Air Quality (IAQ) Management Plan for the pre-occupancy phase by delivering a minimum of 3,500 cu.ft. of outdoor air per sq.ft. of floor area to the space, then once a space is occupied, ventilate at a minimum rate of 0.30 cfm/sq.ft. of outside air or the design minimum outside air rate, whichever is greater, until a total of 14,000 cu.ft./sq.ft. of outside air has been delivered to the space.
EQ4.1	Low Emitting Materials: Adhesives & Sealants	1	All adhesives and sealants used on the interior of the building (defined as inside of the weatherproofing system and applied on-site) should comply with the requirements of the following reference standards: Adhesives, Sealants and Sealant Primers: South Coast Air Quality Management District (SCAQMD) Rule #1168; Aerosol Adhesives: Green Seal Standard for Commercial Adhesives GS-36 requirements in effect on October 19, 2000.

LEED Credit Paragraph	<b>LEED 2.2 Strategy Table</b>	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.
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**BUILDING: TACTICAL EQUIPMENT MAINTENANCE FACILITIES**

PAR	FEATURE		REMARKS
EQ4.2	Low Emitting Materials: Paints & Coatings	1	Paints and coatings used on the interior of the building should comply with the following criteria: 1) Architectural paints, coatings and primers applied to interior walls and ceilings will no exceed the VOC content limits established in Green Seal Standard GS-11, Paints, First Edition, May 20, 1993; 2) Anti-corrosive and anti-rust paints applied to interior ferrous metal substrates will not exceed the VOC content limit of 250 g/L established in Green Seal Standard GC-03, Anti-Corrosive Paints, Second Edition, January 7, 1997; and 3) Clear wood finishes, floor coatings, stains, and shellacs applied to interior elements will not exceed the VOC content limits established in South Coast Air Quality Management District (SCAQMD) Rule 1113, Architectural Coatings, rules in effect on January 1, 2004.
EQ4.3	Low Emitting Materials: Carpet Systems	1	Any carpet installed in the building interior should meet the testing and product requirements of the Carpet and Rug Institute's Green Label Plus program. All carpet adhesive will meet the requirements of EQ Credit 4.1: VOC limit of 50 g/L.
EQ4.4	Low Emitting Materials: Composite Wood & Agrifiber Products	1	4Composite wood and agrifiber products used on the interior of the building should contain no added urea-formaldehyde resins. Laminating adhesives used to fabricate any on-site or shop-applied composite wood and agrifiber assemblies should contain no added urea-formaldehyde resins.
EQ5	Indoor Chemical & Pollutant Source Control	1	It is probable that the credit may be achieved. Incorporate the necessary items that protects the occupants from particulates and chemicals.
EQ6.1	Controllability of Systems: Lighting	1	Provide individual lighting controls for 90% (minimum) of the building occupants to enable adjustments to suit individual task needs and preferences, and provide lighting system controllability for all shared multi-occupant spaces to enable lighting adjustment that meets group needs and preferences.
EQ6.2	Controllability of Systems: Thermal Comfort		
EQ7.1	Thermal Comfort: Design		
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	
	<b>TOTAL</b>	<b>32</b>	

## 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](mailto:richard.l.schneider@usace.army.mil) or [judith.f.milton@usace.army.mil](mailto: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 4<sup>th</sup> IBC - 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 1.1 – 31 MAY 2009**  
**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  $\geq 6'-11"$  (as measured to the underside of the structural system) and having perimeter walls which are  $\geq 4'-11"$ . 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 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

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REQUEST FOR PROPOSAL W912DW-09-T-5400

**864<sup>TH</sup> ENGINEERING BATTALION SMALL EQUIPMENT  
MAINTENANCE FACILITIES (TEMF)**

**PN 069167, FY 2009**

JOINT BASE LEWIS-McCHORD, WASHINGTON

Appendix R: RMS Submittal Register Input Form

APPENDIX R  
RMS Submittal Register Input Form

Not Used

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REQUEST FOR PROPOSAL W912DW-09-T-5400

**864<sup>TH</sup> ENGINEERING BATTALION SMALL TACTICAL  
EQUIPMENT MAINTENANCE FACILITIES (TEMF)**

**PN 069167, FY 2009**

JOINT BASE LEWIS-McCHORD, WASHINGTON

Appendix AA: Sample Tree Preservation Plan

## SAMPLE TREE PRESERVATION PLAN

### 1.0 GENERAL CONDITIONS

- A. Strict adherence to the Tree Preservation Plan, details and specifications will be enforced. If plans have not been prepared, owner is responsible to contract with a qualified professional to prepare a Tree Preservation Plan. All plans shall include identification of the individual trees to receive tree care as per these guidelines. If any deviation from the approved Plan, details and specifications occurs, the Site Development and Building Contractor shall notify the qualified professional to determine what action should be taken.
- B. Prior to any site disturbance, it shall be the responsibility of the Site Development and Building Contractor to install tree preservation measures in accordance with plans and specifications prepared by a qualified professional. It is the Site Development and Building Contractor's responsibility to safeguard the trees designated to be preserved.
- C. The following must not occur within the tree protection area:
  - 1. Stockpiling of soils
  - 2. Operating or storing construction equipment
  - 3. Burning in close proximity to protected areas
  - 4. Regrading causing runoff or flooding
  - 5. Parking vehicles and storing supplies
  - 6. Spilling of toxic materials
  - 7. Spraying of herbicides in close proximity to protected areas
- D. Fines for noncompliance with the Tree Preservation Plans and penalties for any trees lost due to negligence will be assessed according to the local governing agency's regulations.

### 1.1 SCOPE OF WORK

The Site Development and Building Contractor shall provide all materials, labor and equipment to complete all tree preservation work as shown on the plans and specifications. This work may include site preparation, hardscape, grading, drainage, aeration, dewatering and fertilization. It is recommended, that work on individual trees be performed by a certified arborist.

### 1.2 DEFINITIONS

- A. **DIAMETER** (dbh - diameter at breast height) is used when measuring trees over 12 inches in diameter when measured at 4.5 feet above the ground.
- B. **CALIPER** is the diameter of a tree trunk less than 12 inches in diameter.
- C. **SPECIMEN TREES:** Trees having a diameter of 30 inches or more, or trees having 75 percent or more of the diameter of the current state champion tree for that species.
- D. **CRITICAL ROOT ZONE** (crz) is equal to one foot radius for every 1 inch of dbh, except for isolated specimen trees which shall have a crz of 1.5 foot radius for each 1 inch dbh. For example, 30 inch dbh shall have a crz of 45 foot radius. Refer to Tree Preservation plan for delineation of the crz.
- E. **DAMAGE** is any encroachment into the critical root zone.
- F. **QUALIFIED PROFESSIONAL** shall be a registered landscape architect, licensed forester or other specialists recognized by the local regulatory agencies.

### 1.3 MATERIALS

- A. Barricades/Fences: Chainlink, welded wire, board or other approved product. Minimum height shall be 4 feet.
- B. Cable, extra high strength steel, with preformed grip and drop forged attachments.
- C. Erosion Control Bales: straw bales anchored by wood stakes or rebar.
- D. Signage attached to tree protection fence: 11 inches x 15 inches or larger, highly visible to the public and contractors.
- E. Silt Fence, as specified, example 30-inch or 4-foot woven fabric.
- F. Fertilizer: 50 percent organic, slow release, granular or water soluble as dictated by plans and specifications or per soil test, arboricultural grade 32-7-7 or equivalent.

### 1.4 TREE PRESERVATION PROCEDURES

- A. Stakeout:
  - 1. Upon issuance of the clearing, grading and sediment and erosion control permits by the plan review authorities, the Site Development and Building Contractor shall stakeout the limits of clearing, grading, building footprints, sediment and erosion control devices that affect the tree preservation areas. In addition, the Site Development and Building Contractor shall indicate pertinent floor grades on the stakeout.
  - 2. After this procedure is completed, the Site Development and Building Contractor shall stakeout (separate color code) the location of all tree preservation fencing.
  - 3. The Site Development and Building Contractor shall be required to meet onsite with the owner's representative, the qualified professional who prepared the Tree Preservation Plan and the local code enforcement officer to inspect the trees to be saved and to review the protective measures required.
- B. Selective tree removal within the Tree Preservation area:
  - 1. Within the tree preservation area, selected trees and brush as identified on the Tree Preservation Plan, may be removed by hand under the direction of the qualified professional.
  - 2. All final stump cuts are to be made as close as possible to the existing grade.
- C. Tree removal and site work outside the tree preservation area:
  - 1. All areas designated to be root pruned as detailed on the Tree Preservation Plan shall have the work performed at this time. If trenching to root prune, proper backfill procedures, including the layering of backfill and tamping to eliminate settlement, must be done.
  - 2. All tree protection fencing, silt fencing and signage as detailed on the Tree Preservation Plan shall be installed prior to any clearing or grading.
  - 3. All trees removed outside the tree protection fencing shall be taken down without encroachment into the tree preservation area. If stump removal becomes necessary, appropriate precautions should be taken to ensure that the crz is not disturbed.
- D. Tree Maintenance Activities:

1. All tree maintenance shall be carried out under the supervision of a certified arborist. All work performed shall meet or exceed the standards established by the National Arborist Association. All applicable safety requirements shall be strictly adhered to and enforced.
  2. Pruning activities shall be performed on all trees as detailed on the Tree Preservation Plan maintenance schedule. Trees will be pruned to National Arborist Association pruning standards Classes I - IV.
  3. Apply fertilizer as specified on the Tree Preservation Plan. Fertilizer shall be applied in late fall or early spring according to manufacturer's recommendations.
  4. During periods of moisture stress, trees shall be watered whenever soil moisture content is below 50 percent of field capacity. This watering will result in additional cost to the owner as outlined in the contract documents.
  5. Root area of trees where soil has been compacted due to construction activity shall be vertically mulched (aerated) at direction of the qualified professional. This shall be accomplished by auguring the soil in a 2-foot grid pattern to within 3 feet of trunk and to 10 feet beyond the drip line. A 2-inch to 3-inch hand operated augur shall be used to drill holes to a minimum depth of 12 inches. Type of backfill will be determined by the qualified professional. If this procedure is not addressed on the Tree Preservation Plan, it will result in additional cost to the owner.
  6. Any trees whose trunks, limbs or roots are damaged during construction shall be treated within 24 hours. The party responsible for such damage will incur all costs associated with treatment.
  7. Heavy accumulation of dust from construction activity may occur on the surface of tree foliage. To control dust, tree foliage may be hosed down upon the request of the qualified professional. This procedure will result in an additional cost to the owner as outlined in the contract documents.
- E. Removal of all tree protection fencing, silt fencing and signage will be done by the Site Development and Building Contractor when permitted by the local code enforcement officials. Restoration of all areas disturbed by the fencing and/or signage will be the Site Development and Building Contractor's responsibility.

End of Tree Preservation Plan

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REQUEST FOR PROPOSAL W912DW-09-T-5400

**864<sup>th</sup> ENGINEERING BATTALION SMALL TACTICAL  
EQUIPMENT MAINTENANCE FACILITIES, TEMF  
PN 069167, FY 2009**

JOINT BASE LEWIS-McCHORD, WASHINGTON

Appendix BB: Urban Forest Management Program

19 October 2005

## **URBAN FOREST MANAGEMENT PROGRAM FOR TREES IN THE GARRISON AREA OF FORT LEWIS**

### **DIRECTORATE OF PUBLIC WORKS (DPW)**

1. **PURPOSE.** This document is to provide guidance for Fort Lewis personnel to manage, improve and preserve the urban forest within the fenced Garrison Area of Fort Lewis. The urban forest in Garrison Area is defined as the total of all trees, shrubs, vines and groundcover plants throughout the various plant communities in these Fort Lewis grounds. Trees are the only type of woody vegetation addressed herein.

2. **REFERENCE.**

- FORT LEWIS DESIGN THEME STUDY, August 1984; University of Washington
- FORT LEWIS INSTALLATION DESIGN GUIDE, April 1987; Section B.
- FORT LEWIS INSTALLATION DESIGN STANDARDS (draft), 16 May 2005; Landscape Design Standards (Section 10).
- LANDSCAPE DEVELOPMENT PLAN (for historic landscapes), Volume I (1990) and Volume II (30 March 1996), Fort Lewis, WA.
- SECRETARY OF THE INTERIOR'S STANDARDS FOR THE TREATMENT OF HISTORIC PROPERTIES WITH GUIDELINES FOR THE TREATMENT OF CULTURAL LANDSCAPES, 1995.
- INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN (INRMP, in revision), Fort Lewis, WA, April 2000.
- DoD MINIMUM ANTITERRORISM STANDARDS FOR BUILDINGS, UFC 4-010-01, 8 October 2003.
- DoD URBAN FORESTRY MANUAL, August 1996.
- AR 200-3, NATURAL RESOURCES MANAGEMENT, 28 February 1995.

3. **BACKGROUND.** Urban forest management includes the planning, designing, establishing, improving, maintaining, regulating, treating, conserving and protecting of woody vegetation in urbanized areas. In Garrison Area are

the following classes of grounds: Pride (irrigated Improved grounds), Improved, Semi-improved and Unimproved.

Following are definitions of a tree for use of this Plan:

- A single-stem trunk with branches starting several feet above the ground, such as Douglas-fir;
- A small tree with multiple stems starting close to the ground, such as Vine Maple;
- A large, tall overgrown (arborized) shrub with one or more trunks of six (6) inches or more diameter measured at 4.5 feet above the ground, such as English Laurel.

4. URBAN FOREST MANAGEMENT PLAN. The goal is to fulfill the Military Park Theme for Fort Lewis. Tree cover varies from sparse to dense on approximately 6000 acres, which do not include EQR family housing and Clover Park School District areas. Tree types are mostly evergreen (conifers and broadleaf), and deciduous. Trees in various important sites, including the following, need the highest level of maintenance care: Fort Lewis Historic District, Commanding General Arboretum, Watkins Parade Field, and the I Corps & Fort Lewis Headquarters area. Appendix 1 shows the grounds parcels WITHIN Garrison Area not included in this plan. Appendix 2 gives the proposed tree work in FY 06. Urban forest management activities should include control measures for: storm damage, wind and water erosion and sedimentation, insects and diseases detrimental to trees, fire hazards, construction damage and pollution.

4a. OBJECTIVES. Primary objectives for the Urban Forest Management Program are:

- Maintain tree safety for personnel and property
- Develop, maintain and manage urban forest land in Garrison Area to facilitate military missions and operations.
- Protect land, facilities and tree investments from depreciation by adopting natural resource conservation practices based upon soil capabilities.
- Avoid pollution through yard waste disposal (i.e., leaves, grass clippings or prunings) onto the ground.
- Improve the appearance of facilities through preservation of the natural terrain and woody vegetation, and by appropriate plantings of replacement trees in accord with Fort Lewis Installation Design Standards (listed as a reference).
- Assess value of trees, considering replacement value in-kind and the many benefits they give, including air pollution removal, shade and cooling, oxygen, and wind modification.

- Accomplish the Military Park Theme with landscape design in Fort Lewis Garrison Area. This theme was approved in 1984 after a study by the University of Washington Urban Design Program to develop an architectural design theme, based on the early cultural and military values expressed in the historic Garrison Area. The installations original layout enhanced the natural features of the site and created a park like environment for Army personnel. This formal open space focused on the sensational view of Mount Rainier.

4b. Criteria for removing a tree include the following:

- a. Dead tree: A tree without any live foliage (leaves or needles) nor live wood under the bark.
- b. A tree too close to other established trees (crowded) that its benefit to the site is minimal;
- c. Hazard tree, as determined by use of a hazard evaluation form to record specific findings and recommendations (DNR Urban & Community Forestry Program or International Society of Arboriculture).
- d. Destruction of tree from wind or other forces of nature, or a vehicle or construction equipment;
- e. Fatally diseased, such as 25% or more of an Elm tree's canopy infected with Dutch Elm Disease;
- f. Adversely impacting a real property building, sidewalk or other structure, or utility lines (overhead or underground) with structural damage or impending damage, loss of utility, or personal injury (actual or potential);
- g. Severely unsightly tree which detracts from a high-visibility area.

5. RESPONSIBILITIES. Public Works will inform the Garrison Commander for prior approval to cut/remove trees located in the Garrison Area and any high-priority site. PW will annually prepare the five-year Urban Forest Plan and submit it to Work Management Center for resourcing.

6. TECHNICAL ASSISTANCE.

- TM 5-630, Natural Resources/Land Management, 1 July 1982.
- Urban & Community Forestry Program, Washington Department of Natural Resources, Olympia, WA; phone 1-800-523-8733 or [URBAN\\_FORESTRY@WADNR.GOV](mailto:URBAN_FORESTRY@WADNR.GOV).

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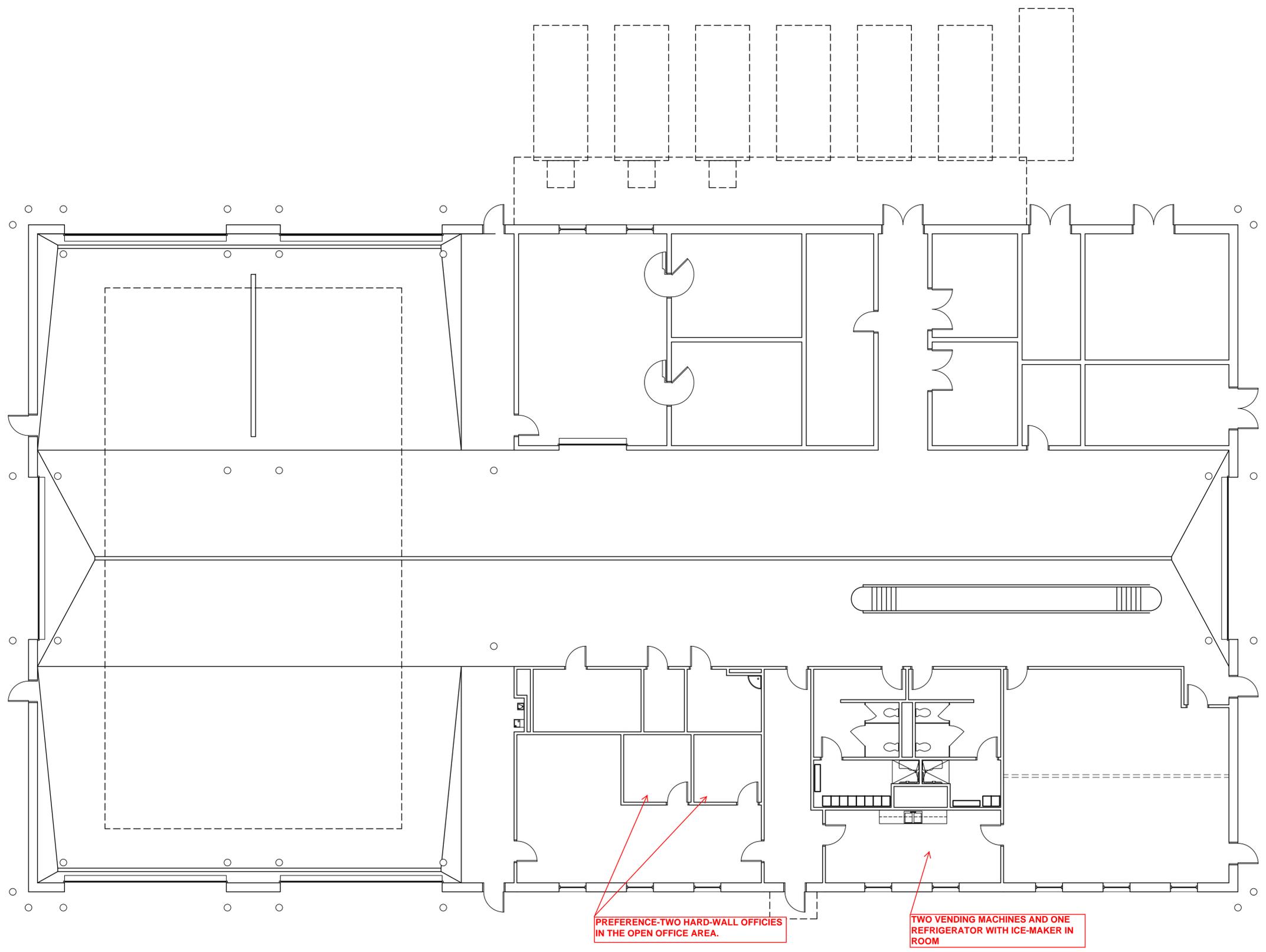
REQUEST FOR PROPOSAL W912DW-09-T-5400

**864<sup>TH</sup> ENGINEERING BATTALION SMALL TACTICAL  
EQUIPMENT MAINTENANCE FACILITIES (TEMF)**

**PN 069167, FY 2009**

JOINT BASE LEWIS-McCHORD, WASHINGTON

Appendix CC: EXAMPLE OF HARD-WALL  
ADMINISTRATIVE OFFICES LOCATED IN OPEN  
OFFICE AREA (AS PER PREFERENCES)



PREFERENCE-TWO HARD-WALL OFFICES  
IN THE OPEN OFFICE AREA.

TWO VENDING MACHINES AND ONE  
REFRIGERATOR WITH ICE-MAKER IN  
ROOM

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REQUEST FOR PROPOSAL W912DW-09-T-5400

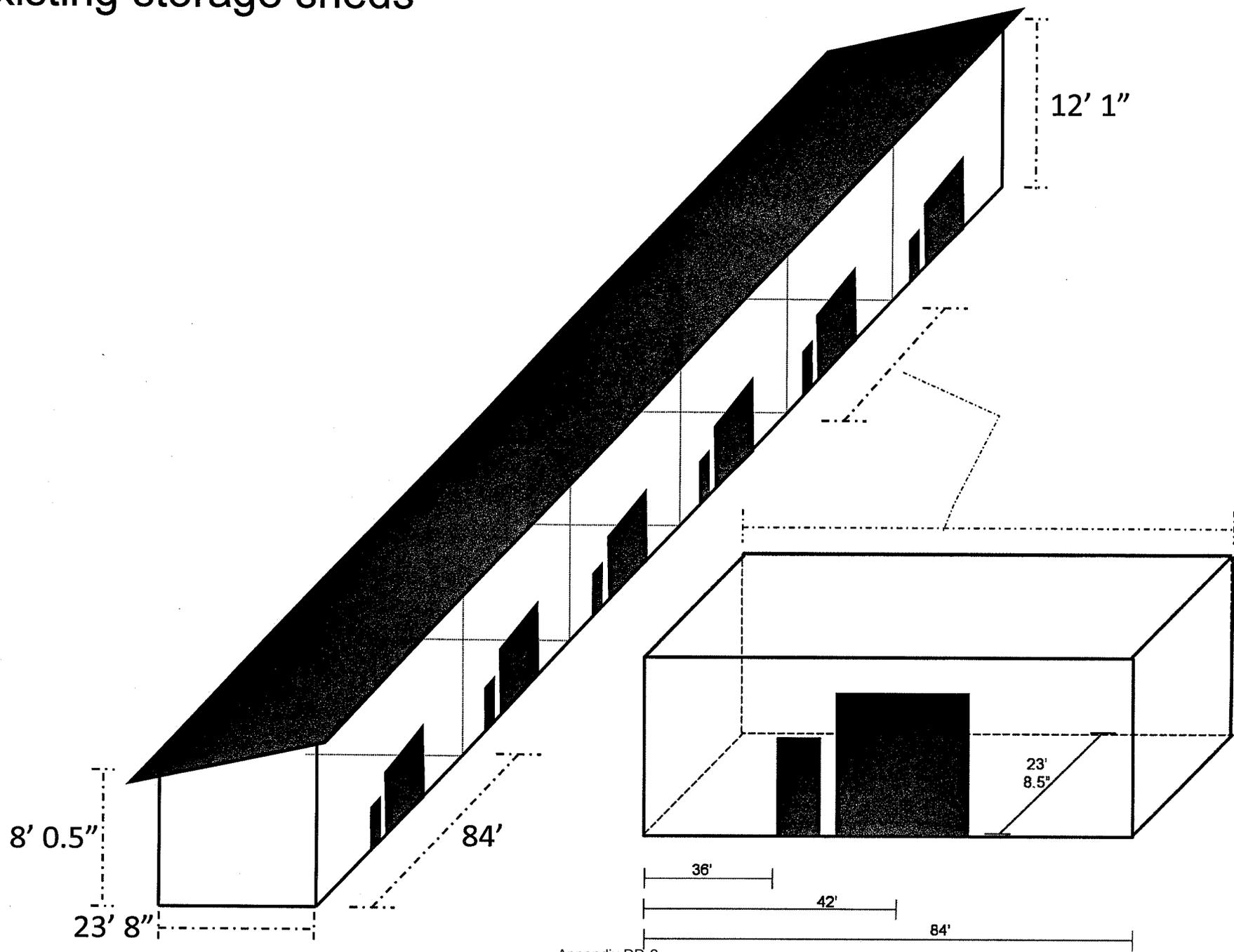
**864<sup>TH</sup> ENGINEERING BATTALION SMALL TACTICAL  
EQUIPMENT MAINTENANCE FACILITIES (TEMF)**

**PN 069167, FY 2009**

JOINT BASE LEWIS-McCHORD, WASHINGTON

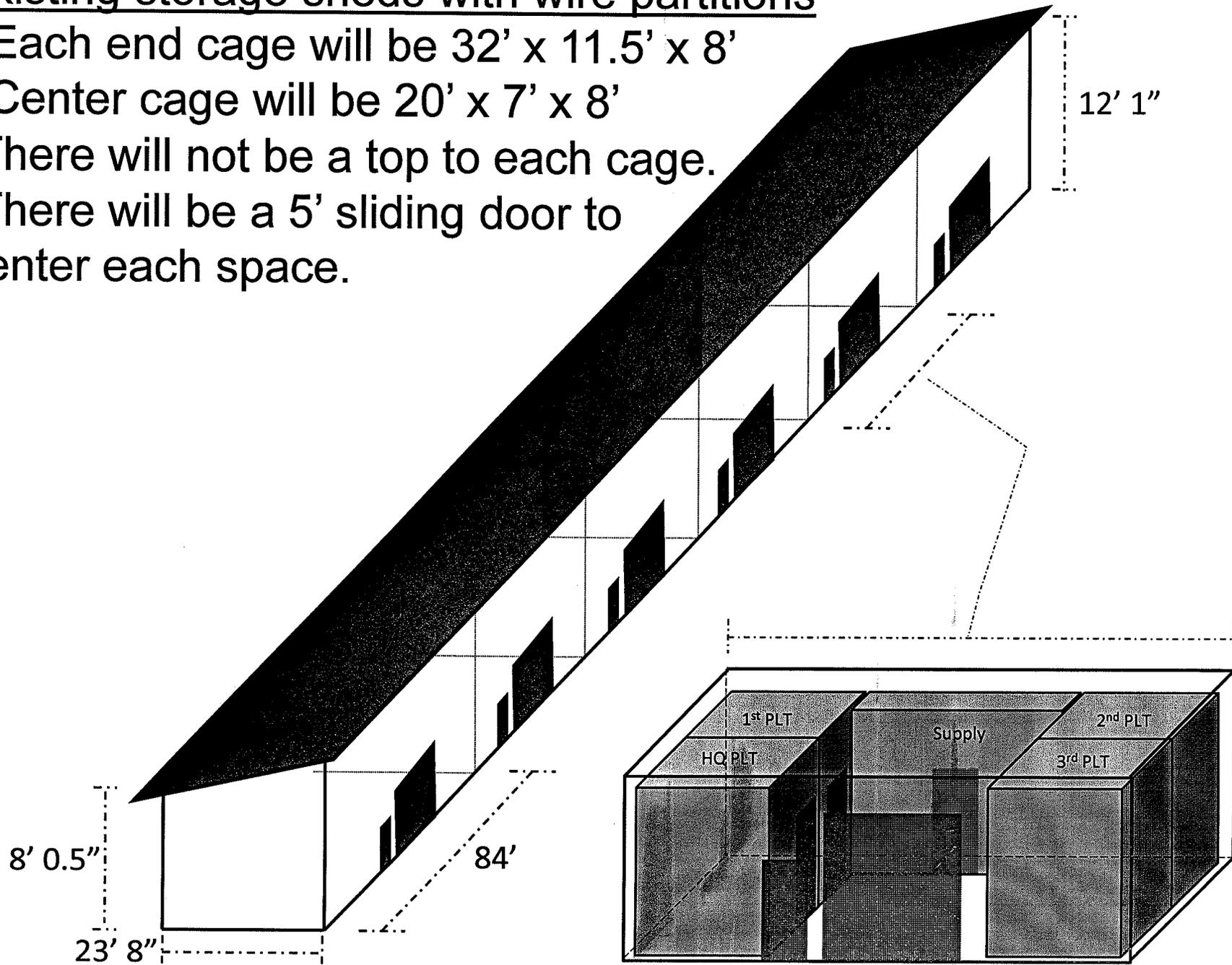
Appendix DD: EXAMPLE CAGES TO BE  
INSTALLED IN ORGANIZATIONAL STORAGE  
BUILDING (AS PER PREFERENCES)

# Existing storage sheds



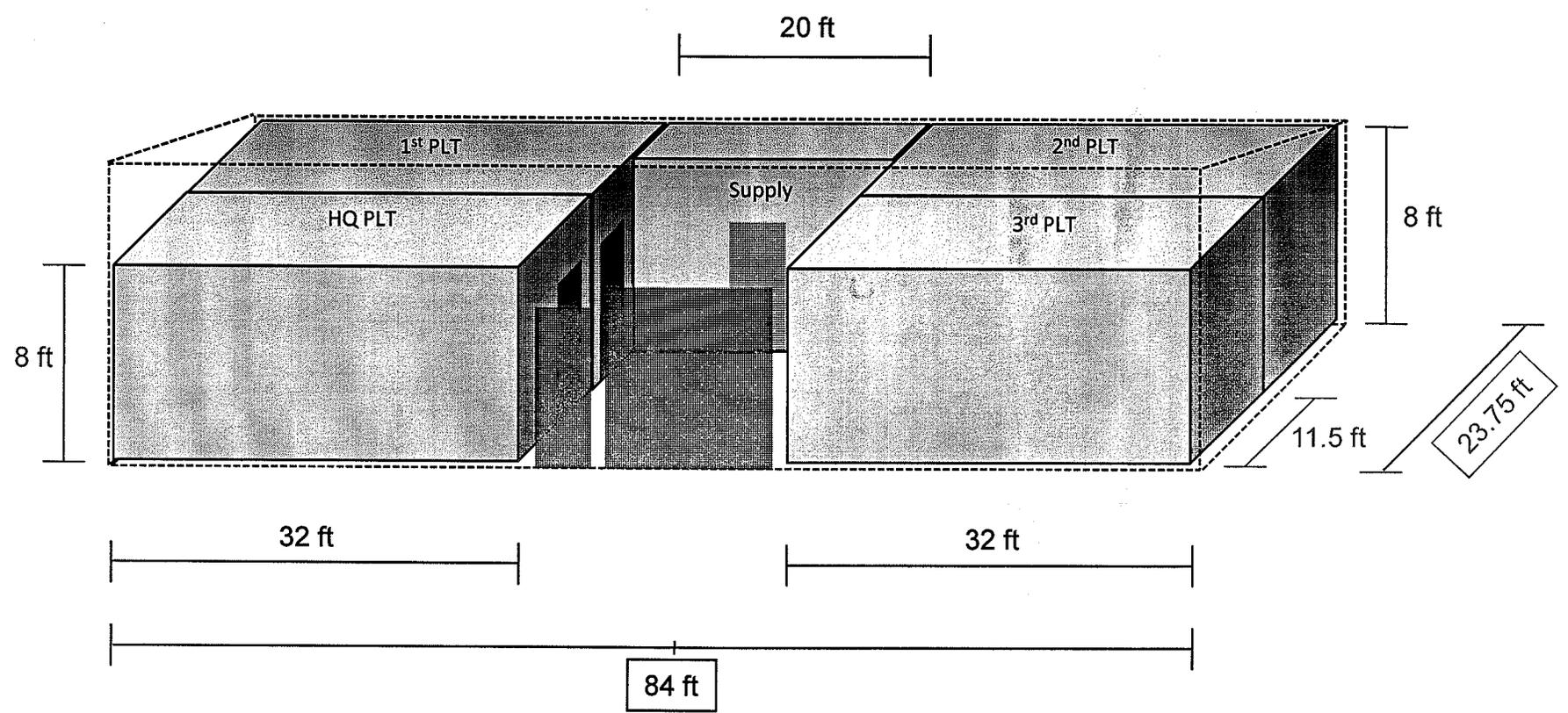
## Existing storage sheds with wire partitions

- Each end cage will be 32' x 11.5' x 8'
- Center cage will be 20' x 7' x 8'
- There will not be a top to each cage.
- There will be a 5' sliding door to enter each space.



### Wire cage partitions Close-Up

- Each end cage will be 32' x 11.5' x 8'
- Center cage will be 20' x 7' x 8'
- There will be a 5' sliding door to enter each space.



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REQUEST FOR PROPOSAL W912DW-09-T-5400

**864<sup>TH</sup> ENGINEERING BATTALION SMALL TACTICAL  
EQUIPMENT MAINTENANCE FACILITIES (TEMF)**

**PN 069167, FY 2009**

JOINT BASE LEWIS-McCHORD, WASHINGTON

Appendix EE:

STREET DESIGN GUIDELINES-TURNING RADII  
STREET STANDARD-PARKING PARK

# Street Design Guidelines

**Turning Radii  
Between Road Types  
(feet)**

Hierarchy of Streets		Turning Radii Between Road Types (feet)													
		Tank Trail	Multiway Boulevard - 2 Access Lanes	Multiway Boulevard - 1 Access Lanes	Boulevard	Avenue	Parkway	District Street	Main Street	Neighborhood Street	Park Street	Alley	Truck Access/Parking Curb Cut	POV Parking Curb Cut	
Highest (Primary)	Tank Trail	50	50	50	50	50	50	50	50	50	50	50	50	50	10
	Multiway Boulevard - 2 Access Lanes	50	40	40	40	30	20	20	15	15	10	10	40	10	
	Multiway Boulevard - 1 Access Lanes	50	40	40	40	30	20	20	15	15	10	10	40	10	
	Boulevard	50	40	40	40	30	20	20	15	15	10	10	40	10	
	Avenue	50	30	30	30	30	20	20	15	15	10	10	40	10	
	Parkway	50	20	20	20	20	20	20	15	15	10	10	40	10	
	District Street	50	20	20	20	20	20	20	15	15	10	10	40	10	
	Main Street		15	15	15	15	15	15	15	15	10	10		10	
	Neighborhood Street		15	15	15	15	15	15	15	15	10	10		10	
	Park Street		10	10	10	10	10	10	10	10	10	10		10	
Lowest (Secondary)	Alley		10	10	10	10	10	10	10	10	10		10		
	Truck Access/Parking Curb Cut	50	40	40	40	40	40	40							
	POV Parking Curb Cut	10	10	10	10	10	10	10	10	10	10				

Travel Lanes Width	Design Speed
10 feet	25 mph or below
11 feet	26 - 35 mph and truck routes
12 feet	Above 35 mph
14 feet	Tank Trails

Parallel Parking Lane Width	Design Speed
7 feet	25 mph or below
8 feet	Above 25 mph to 35 mph
9 feet	Above 35 mph

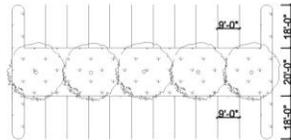
  

30° Angle Parking Lane Width	Design Speed
17.3 feet	25 mph or below

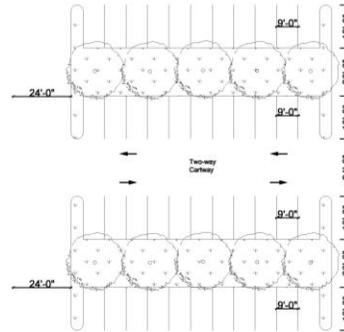


# Street Standard | *Parking Park*

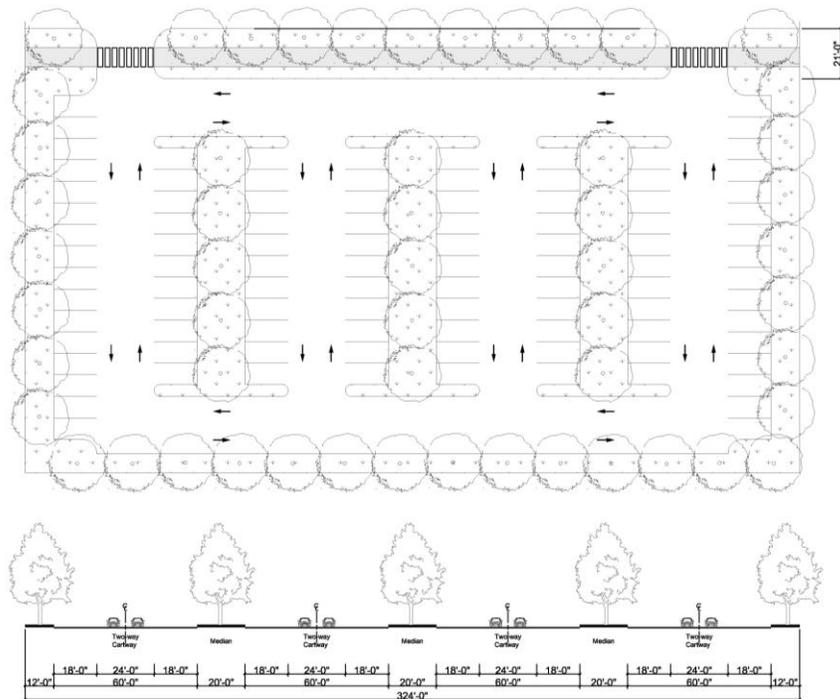
TYPICAL PARKING BAY



PARKING BAY ADJACENCIES  
(repeat as necessary)



TYPICAL CAR PARK



**NOTE:**

1. Medians shall be landscaped with trees 20' to 30' on-center.
2. Medians shall be a minimum of 20' in width and extend the entire length of the parking aisle.
3. Medians shall act as swales with a depression of 18".
4. Cartways shall be 24' wide maximum.
5. Parkway area shall be set back a minimum 21' from road edge.
6. Parking spaces shall be 9' wide and 18' deep.
7. Any variation to parking design must be approved by Fort Lewis Public Works.



**APPENDIX EE**  
**PHOTOS OF EXISTING CAR PARKS**

DESIGN FREEDOM: Photographs presented in this Appendix are intended to show the as-built car parks on Joint Base Lewis-McChord. These photographs are not intended to restrict the creative approach of the contractor's proposals, nor are they intended to constrain the selection of materials beyond the requirements stipulated in this RFP.





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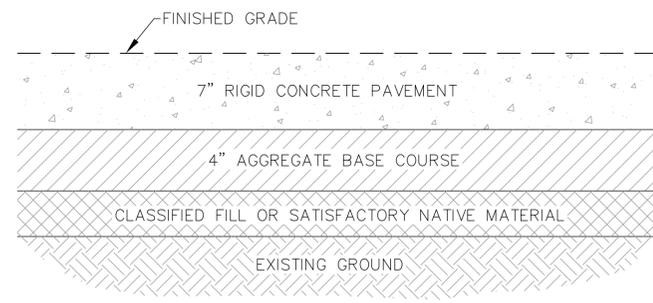
REQUEST FOR PROPOSAL W912DW-09-T-5400

**864<sup>TH</sup> ENGINEERING BATTALION SMALL TACTICAL  
EQUIPMENT MAINTENANCE FACILITIES (TEMF)**

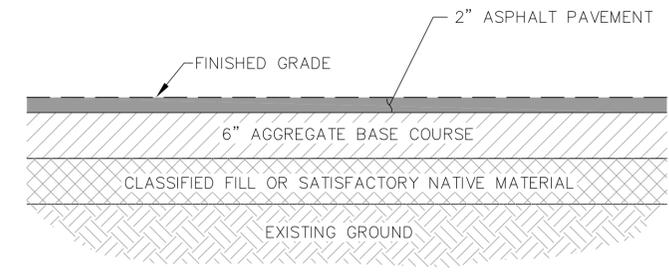
**PN 069167, FY 2009**

JOINT BASE LEWIS-McCHORD, WASHINGTON

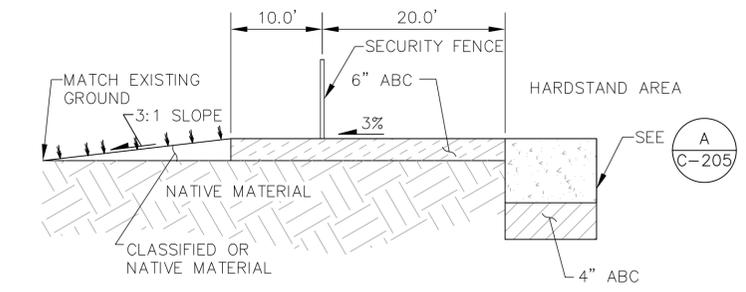
Appendix FF:  
Concrete Details from Immediately adjacent Site  
For Reference Only



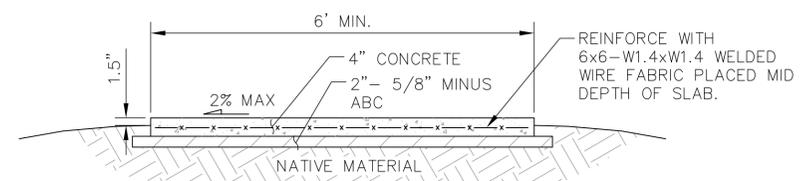
**A** **TYPICAL HARDSTAND SECTION**  
SCALE: NTS



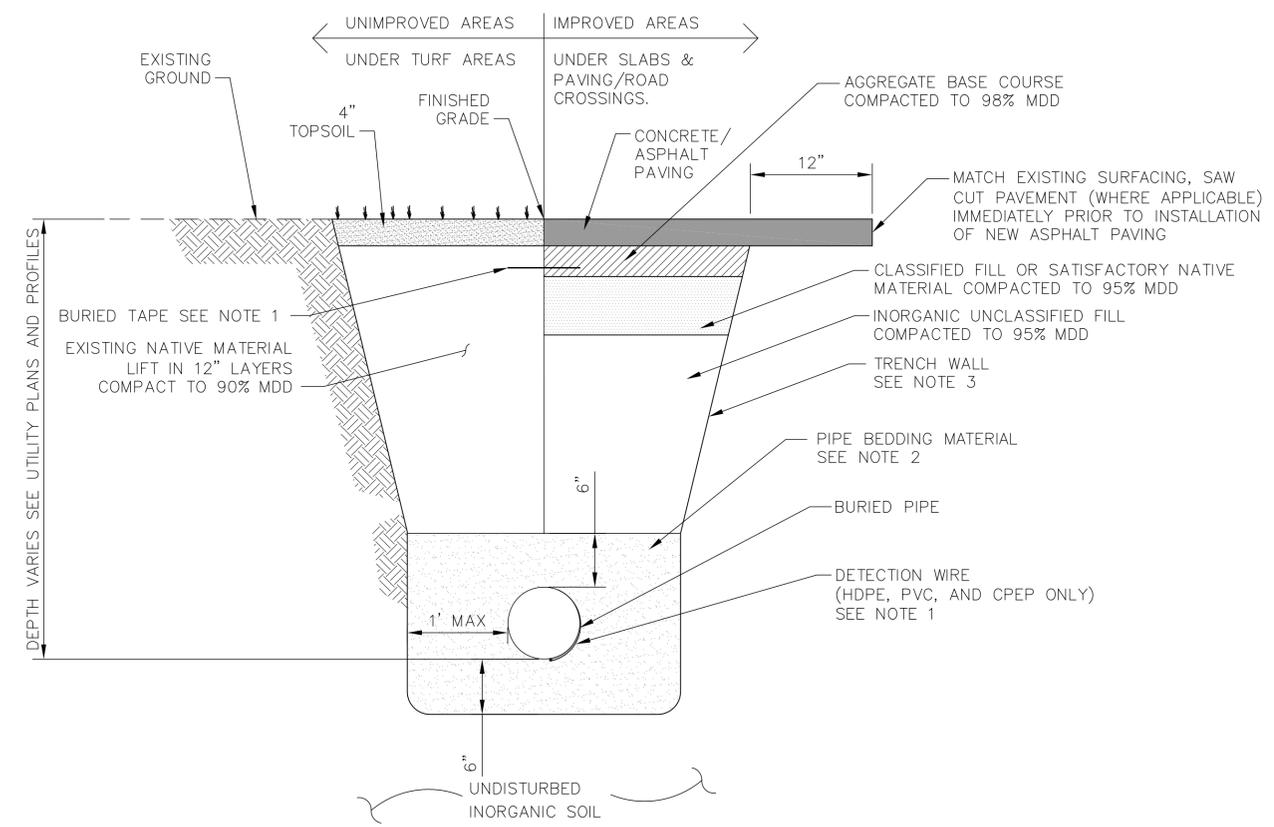
**B** **TYPICAL ASPHALT SECTION**  
SCALE: NTS



**C** **TYPICAL PERIMETER GRAVEL SECTION**  
SCALE: NTS



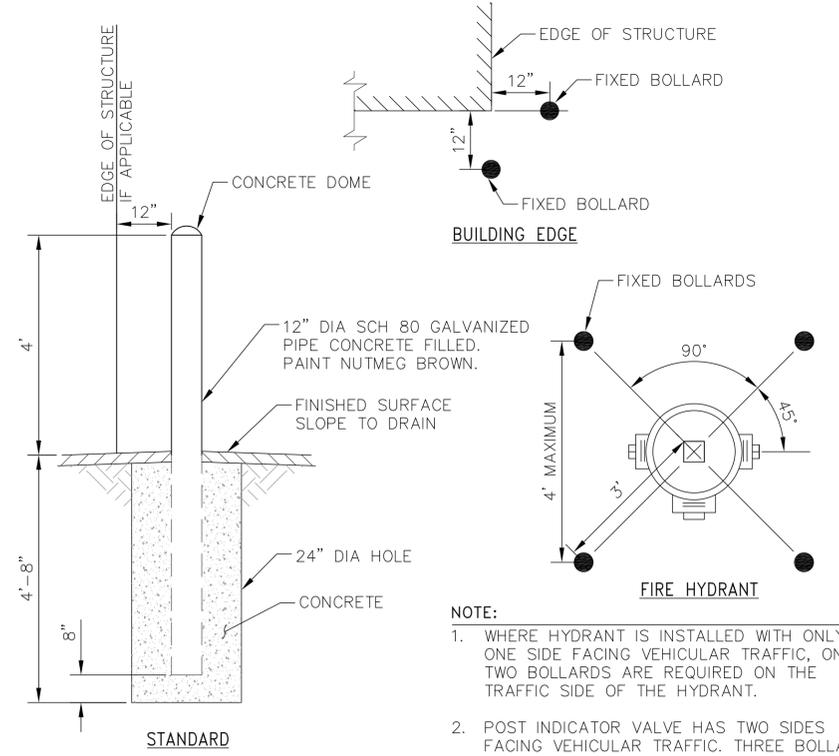
**D** **TYP SIDEWALK SECTION**  
SCALE: NTS



**NOTES:**

1. WARNING TAPE SHALL BE THE TYPE AS INDICATED IN THE SPECIFICATIONS. THE TAPE SHALL BE BURIED AT 12" BELOW GRADE FOR THE ENTIRE LENGTH OF THE LINE. HDPE, CPEP, AND PVC PIPE SHALL ALSO HAVE LOCATING WIRE INSTALLED IN ACCORDANCE WITH THE SPECIFICATIONS.
2. PIPE BEDDING MATERIAL SHALL BE A CLEAN WELL GRADED MATERIAL WITH A MAXIMUM PARTICLE SIZE OF 1.5" AND NOT MORE THAN 10% PASSING THE #200 SIEVE. MATERIAL SHALL BE COMPACTED TO 95% MDD IN PAVEMENT AREAS.
3. TRENCH WALL SHALL BE SLOPED OR SHORED IN CONFORMANCE WITH ALL APPLICABLE SAFETY STANDARDS.

**E** **TYPICAL TRENCH SECTION**  
SCALE: NTS



**1** **FIXED BOLLARD**  
SCALE: NTS



MARK	DESCRIPTION	DATE	APPR.
3/31/2009	IFC SUBMITTAL	3/31/2009	
2/5/2009	100% SUBMITTAL	2/5/2009	
11/19/2008	35% PROGRESS SUBMITTAL	11/19/2008	

DESIGNED BY: TRAVIS WOODS	DATE: MARCH 31, 2009
DWN BY: DST	SOLICITATION NO.: W912H06D002 0001
SUBMITTED BY: TRAVIS WOODS	CONTRACT NO.: FY08PN0842
FILE NAME: 1303C_0203_BCDWG	FILE NUMBER:

MEDIUM TACTICAL EQUIPMENT  
MAINTENANCE FACILITY  
FT. LEWIS, WA  
ISSUED FOR CONSTRUCTION  
CIVIL  
TYPICAL SECTIONS

SHEET NUMBER:  
**C-205**  
SHEET OF

**NOT FOR CONSTRUCTION: FOR REFERENCE ONLY**

EXPIRES 09/15/09

1

2

3

4

5

Section

D

C

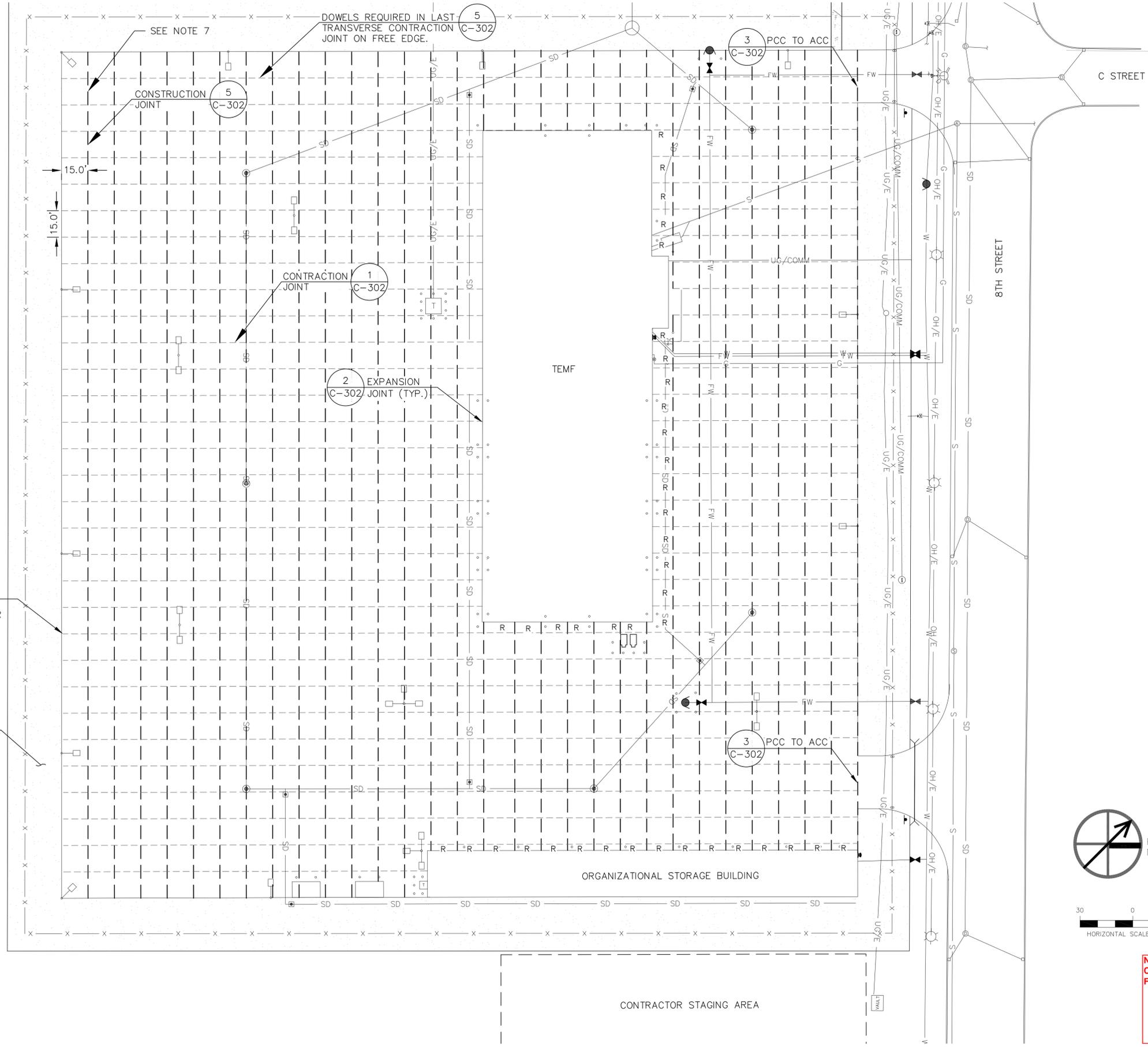
B

A

- NOTES:
1. ASSUME PAVING LANES RUN PARALLEL TO THE TEMP.
  2. USE 4"x4" WELDED WIRE FABRIC IN APRON AREAS WHERE LENGTH TO WIDTH RATIO EXCEEDS 1.25:1 OR IN SLABS THAT ARE NOT RECTANGULAR IN SHAPE. PLACE MESH AROUND ALL UTILITY PENETRATIONS. AREAS REQUIRING REINFORCEMENT ARE DESIGNATED WITH AN "R".
  3. EMBED WIRE FABRIC 2.75" BELOW TOP OF SLAB. REINFORCEMENT SHALL BE 3" CLEAR FROM ANY EDGE OR JOINT.
  4. BOXOUT AND USE EXPANSION JOINTS AROUND NEW MANHOLES, CATCH BASINS, AND OTHER UTILITY PENETRATIONS.
  5. DIAGONALLY SAWCUT CONTRACTION JOINTS AROUND MANHOLES AS SHOWN ON DETAIL 6, SHEET C-302.
  6. REINFORCEMENT ABBREVIATED AS "R" ON C-301.
  7. PAVING LANES SHALL BE 15 FEET WIDE.

4 PCC TO GRAVEL SHOULDER (TYP.)

GRAVEL SHOULDER (TYP.)



30 0 15 30  
HORIZONTAL SCALE IN FEET

NOT FOR CONSTRUCTION:  
FOR REFERENCE ONLY



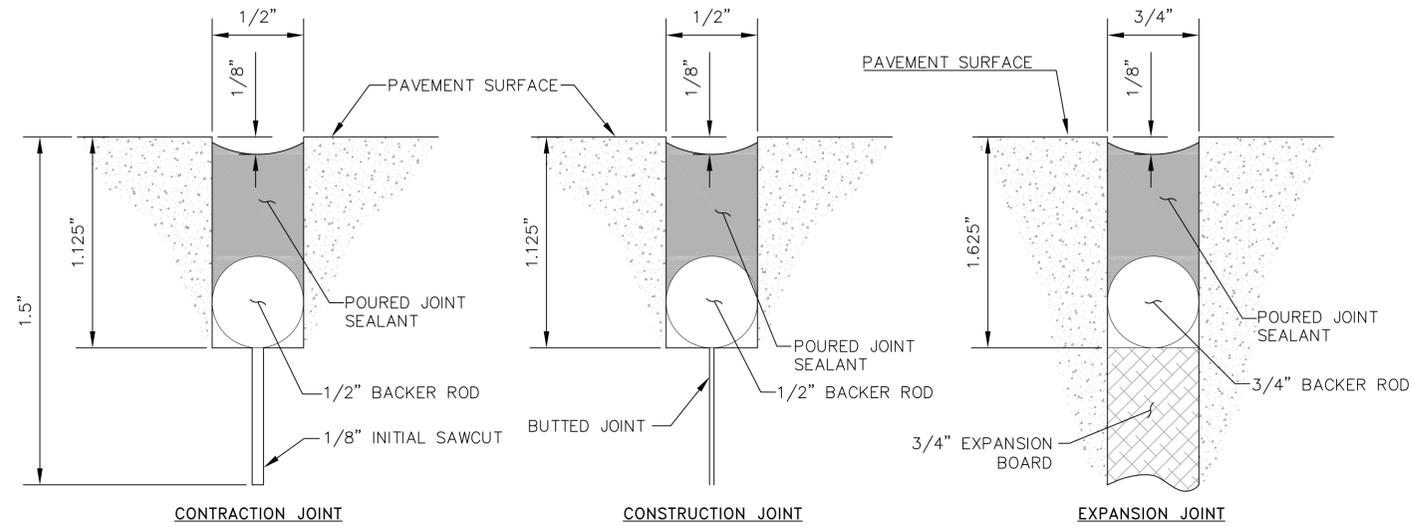
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	100% SUBMITTAL	3/11/2009					
	75% PROGRESS SUBMITTAL	2/5/2009					
	35% PROGRESS SUBMITTAL	11/19/2008					

DESIGNED BY: TRAVIS WOODS  
 DWN BY: THW  
 SUBMITTED BY: TRAVIS WOODS  
 PLOT SCALE: 1" = 30'-0"
 FILE NAME: 4303\_C-301\_BCDWG  
 DATE: MARCH 31, 2009  
 SOLICITATION NO.: W912HQ-06-D-002 0001  
 CONTRACT NO.: FY06-PN-08842  
 FILE NUMBER:

U.S. ARMY CORPS OF ENGINEERS  
 SAVANNAH DISTRICT  
 SAVANNAH, GEORGIA  
 Bristol  
 ENVIRONMENTAL & ENGINEERING  
 SERVICES CORPORATION  
 Phone (907) 563-4013 Fax (907) 563-8713

MEDIUM TACTICAL EQUIPMENT  
 MAINTENANCE FACILITY  
 FT. LEWIS, WA  
 ISSUED FOR CONSTRUCTION  
 CIVIL  
 PAVEMENT JOINT LAYOUT  
 SHEET NUMBER:  
**C-301**  
 SHEET OF

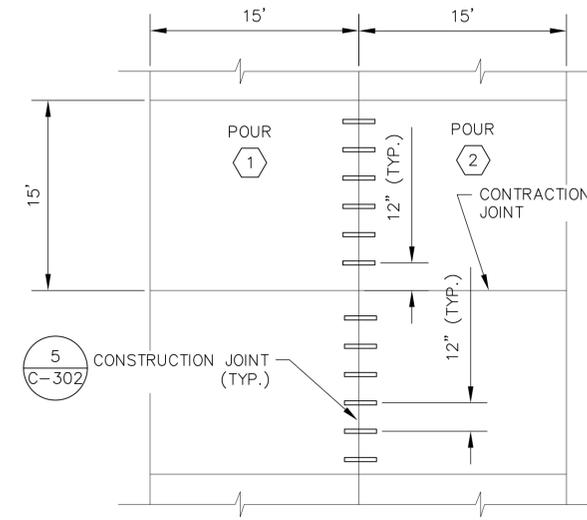




1 CONCRETE JOINT DETAILS  
SCALE: NTS

NOTE:

1. CONTRACTOR HAS THE OPTION OF USING COMPRESSION SEALS (SPEC. 32 13 73) IN LIEU OF Poured JOINT SEALANT.



2 DOWEL SPACING DETAIL  
SCALE: NTS

NOTE:

1. CONTRACTOR SHALL DOWEL LAST TRANSVERSE CONSTRUCTION JOINT FROM FREE EDGE.

NOT FOR  
CONSTRUCTION:  
FOR REFERENCE  
ONLY



MARK	DESCRIPTION	DATE	APPR.	MARK	DESCRIPTION	DATE	APPR.
3/31/2009	IFC SUBMITTAL	3/31/2009					
2/6/2009	100% SUBMITTAL	2/6/2009					
11/19/2008	75% PROGRESS SUBMITTAL	11/19/2008					
	95% PROGRESS SUBMITTAL						

DESIGNED BY: TRAVIS WOODS	DATE: MARCH 31, 2009
DWN BY: DST	SOLICITATION NO.:
CKD BY: TMW	W912HJN9-D-0027 0001
SUBMITTED BY: TRAVIS WOODS	CONTRACT NO.:
	FY06-PN-8842
PLOT SCALE:	FILE NUMBER:
1:1	
SIZE:	FILE NAME:
A36 D	4350C-C-302-303 B.C.DWG

MEDIUM TACTICAL EQUIPMENT  
MAINTENANCE FACILITY  
FT. LEWIS, WA  
ISSUED FOR CONSTRUCTION  
CIVIL  
PAYEMENT JOINT DETAILS

SHEET NUMBER:  
C-303  
SHEET 0F

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REQUEST FOR PROPOSAL W912DW-09-T-5400

**864<sup>TH</sup> ENGINEERING BATTALION SMALL TACTICAL  
EQUIPMENT MAINTENANCE FACILITIES (TEMF)**

**PN 069167, FY 2009**

JOINT BASE LEWIS-McCHORD, WASHINGTON

Appendix GG:

The Army's Facility Planning System (FPS)

Parking Area-Organizational Vehicles

## CatCode 852 10, Organizational

<b>The Army's Facility Planning System (FPS)</b>		
*** Allowances in Peacetime Criteria ***		
Project Name: Lewis 69167		3/23/2010
Prepared By: Brinson		06:53:14ET
		Location: CONUS
12-MAR-2008 OTOE DATA		
Composite Identification: 69167 ENGR		

**Category Code:** 85210 Parking Area, Organizational Vehicles

**FPS CatCode Group:** VM Vehicle Support Group

**Allowance:** Initial value: 16077 SY

**Description:**

This facility consists of a prepared, surfaced area with either bitumen, concrete, paving block, cobblestones, or gravel/tar treatment used for parking TOE/SRC unit and TDA organization military (wheeled, tracked), commercial vehicles trailers and generators, which is normally located as part of, or in proximity to, the maintenance complex. It includes: parking spaces, access lanes and circulation lanes within the hardstand, or associated with the vehicle maintenance area and also includes all paving associated with the vehicle storage sheds (category code 44262). Parking covered only with gravel is considered unsurfaced (85211). Areas for privately owned vehicles (POV), or non-organizational vehicles are under category code 85215. This facility includes aprons and circulation lanes associated with each of the facilities located in the maintenance complexes, to include:

<b>Category Code</b>	<b>Description</b>
12311	Land Vehicle Fueling Facility, MOGAS
12322	Land Vehicle Fueling Facility, Diesel
14165	Fueling/POL Support Building
21410	Vehicle Maintenance Shop
21470	Oil Storage Building
21885	Maintenance Shop, General Purpose
21910	Engineering/Housing Maintenance Shop
44224	Organizational Storage Building
44262	Vehicle Storage Shed

**Criteria:**

The total pavement allowance under this category code is dependent on the type and size of facilities included in the maintenance complex; the parking area allowance is based on the quantity and size of organizational vehicles authorized (normally at strength level 1), to include the circulation aisle(s). The parking configuration utilized for calculation of the area needed is as follows:

1. Parking stalls are placed back-to-back with access lane widths of 30 feet for vehicles less than or equal to 18 feet long and 45 feet for vehicles more than 18 feet long.
2. All circulation lane widths are 30 feet.
3. Trailers other than semitrailers are usually parked with their prime movers.
4. Side clearances for parking of vehicles are 3 linear feet. End clearances are 2 linear feet
5. Unit integrity of parked vehicles is maintained where possible. However, partially filled parking rows will be filled by vehicles from the next organization.
6. POL vehicles are parked in a physically separated area in rows 50 feet apart, with a 10-foot clearance between vehicles.
7. When vehicle storage sheds (category code 44262) are authorized, combat vehicles are parked at the rate of 16 vehicles per shed. Sheds measure 95 feet by 148 feet and are spaced 82 feet apart along the side and 33 feet apart at the end
8. For category codes:

21410	Tactical Equipment Maintenance Facility (TEMF)
21885	Maintenance Shop, General Purpose
21910	DPW Maintenance Shop

The total area provided for these facilities includes facility aprons measuring 45 feet on all four sides of the facility. Additionally, a 20 foot wide circulation lane is provided on all four sides of the facility

9. For category code 21470 - Oil Storage Building:  
The pavement associated with this building consists of apron only, as it is assumed to be sited adjacent to a circulator

## CatCode 852 10, Organizational

lane which is accounted for by other facilities. The apron area extends along the entire building length on one side. B: using an assumed building length of 20 feet, and a fixed apron depth of 27 feet, each facility is assigned 84 square yards. Because this allowance is generally quite small, it is ignored in the computation below

10. For category code 44224 - Organizational Storage Building

The pavement associated with this building consists of apron only, since the building is assumed to be sited adjacent to a circulation lane which is accounted for by other facilities. The apron area extends along the entire building length on one side. The computation used in the FPS assumes a building width of 25 feet, and a fixed apron depth of 27 feet

11. For category code 44262 - Vehicle Storage Sheds:

See the Basis of Calculation section below.

**References:**

Army Criteria Tracking System (ACTS)	28 Dec 2006
TI 800-01, Chapter 4	18 Mar 2002
DA PAM 415-28, Guide to Army Real Property Category Codes	11 Apr 2006
UFC 4-214-02, Tactical Equipment Maintenance Facility (TEMF) Standard Design	5 Oct 2007

**Basis of Calculation:**

The paved areas included under this category code consist of vehicle parking areas as well as the aprons and circulation lanes associated with each of the facilities located in a maintenance complex. The total pavement allowance is based on the type and size of the vehicles and facilities.

The parking allowances are based on the number and size of organizational vehicles authorized (usually at strength level 1). The initial step is to identify and separate these vehicles according to their parking needs. The calculation of hardstand pavement allowances is based on back-to-back parking stalls with access lane widths of 30 feet for vehicles less than or equal to 18 feet long and 45 feet for vehicles greater than 18 feet long. (For POL vehicles, see POL Vehicle Parking below.)

The Trigger/Counter (T/C) codes are as follows:

- A - Trucks, 5/4 ton or less
- B - Trucks, 2-1/2 ton
- C - Trucks, 5 ton
- D - Trucks, 8-ton and greater
- E - Trucks, Tractor
- F - Trucks, 2-1/2 ton, can haul TPUs
- G - Trucks, 5-ton, can haul TPU's
- J - Trailers towed by Truck Class A
- K - Trailers towed by Truck Class B
- L - Trailers towed by Truck Class C
- M - Trailers towed by Truck Class D
- N - Semitrailers
- P - POL Tank Trucks
- Q - TPUs and Trailer-mounted Fuel Tanks
- S - POL Semitrailers
- T - Tracked Vehicles
- V - Class IX Supply Trailers (to be parked adjacent to warehouse)
- W - Trailers towed by Truck Class A, can haul TPU's
- X - Vehicles/Equipment which do not pull trailers
- Y - Trailers towed by Truck Class B, can haul TPU's
- Z - Trailers towed by Truck Class C, can haul TPU's

The vehicles and trailers with their length and width dimensions are identified by equipment Line Item Number (LIN). The POL (Petroleum, Oil and Lubricant) vehicles, including Tank and Pump Units (TPUs), and trailer-mounted tank units, are separated, and five-ton trucks and 1-1/2-ton trailers are allocated to transport the TPUs and the trailer mounted tank units. Class IX vehicles are also identified and separated, as they will be parked on the apron areas adjoining the warehouse and DS maintenance shop, and are not allowed additional hardstand. Other vehicles separated are the combat vehicles designated for parking in the vehicle storage sheds (category code 44262), which are authorized for Europe and Korea only. Subsequent to the identification of all vehicles, the trailers are matched with trucks by company, based on weight classifications.

The space allowance for parking the vehicles is based on a standardized layout conforming to the above criteria. Constant site width for each of the unique conditions was established based on a standard layout for the site structures. The parking stalls are then plotted mathematically, starting with the longest vehicle or vehicle/trailer combination in the first organization in the user's list, continuing through each organization, and going alternately from shortest to longest and longest to shortest vehicles.

The longest vehicle or vehicle combination in each row establishes the row width and the width of the access lane. Circulation lanes 30 feet wide extend along both sides of the hardstand

For a facility located in Alaska, a 30 foot stabilized area for snow storage is authorized around the perimeter of the parking area. This area is not included in the FPS calculations.

**POL Vehicle Parking**

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The POL vehicle parking area is presumed to be physically separated from the regular vehicle hardstand and is calculated separately. POL Semitrailers with tractor are allowed a 19-foot by 55-foot space with a 50-foot access lane. Other POL vehicles are assigned a 19-foot by 40-foot space with a 50-foot access lane. The computer program matches tractors and semitrailers to other POL Truck-trailer combinations prior to calculating space allowances.

**Vehicle Storage Sheds**

When authorized, Vehicle Storage Sheds (category code 44262) are used for parking up-loaded combat vehicles. The aprons and side clearance areas for these sheds are included with category code 85210. The vehicles utilized to quantify category code 44262 are subtracted prior to the computation of the following algorithms, which conform to the criteria provided

Single Full Shed 1997.4 SY/ea.  
 Single Half-Shed 1823.3 SY/ea.

Aprons for Vehicle Storage Sheds are not shared.

The following equations develop the areas above:

Single Full Shed  
 $((SWID + 33FT) (SLNH + 82 FT) - (SWID \times SLNH)) / 9$

Single Half-Shed  
 $((SWID + 33 SF) (1/2 SLNH + 82 FT) - (SWID \times 1/2 SLNH)) / 9$

Where:

SWID = SHED WIDTH = 148 FT  
 SLNH = SHED LENGTH = 95 FT

**Summary**

The number of tactical vehicles and major equipment items in the planning base for organizational parking (category code 85210) plus the number of combat vehicles, radars, and major weapons systems in the planning base for vehicle storage sheds (category code 44262) equals the total number of major pieces of equipment for which space is provided in the maintenance complex. This is not equal to the total number of parking spaces, due to factors such as vehicle storage sheds in Europe and Korea, the pairing of trucks and trailers in single parking spaces based on pavement usage optimization, the diversion of Class IX storage vans to the area around the maintenance shop where they are more easily accessed by maintenance personnel, the mounting of TPU's on trucks or trailers, etc.

**Planning Base:**

Type, Size, and Number of Organizational Vehicles

**Equipment Triggers and Counters:**

05435G000 2 ENGINEER BATTALION  
 05436G000 2 HHC, ENGR BN

<u>LIN</u>	<u>LIN Description</u>	<u>Paragraph</u>	<u>Length (Inches)</u>	<u>Width (Inches)</u>	<u>T/C Code</u>	<u>Quantity</u>
C18234	CARRIER PERSONNEL FULL TRACKED: AF	01	204	100	T	1
Z00958	TRK UTILITY COMMAND AND CONTROL IAI	01	194 *	110 *	A	2
D82404	DECONTAMINATING APPARATUS: PWR DF	02	45	24	X	2
G36237	GENERATOR SET DIESEL: 60HZ AC	02	30	23	X	1
T60081	TRUCK CARGO: 4X4 LMTV W/E	02	255	96	F	1
T61908	TRUCK CARGO: MTV W/E	02	278	96	G	1
T95992	LIGHT TACTICAL TRAILER: 3/4 TON	02	132	86	J	1
T96564	TRAILER FLAT BED: M1082 TRLR CARGO L	02	210	96	K	1
Z00958	TRK UTILITY COMMAND AND CONTROL IAI	02	194 *	110 *	A	3
Z01013	TRUCK UTILITY: ECV SHELTER/TROOP/CA	02	194 *	110 *	A	2
Z36683	TRAILER TANK WATER (CAMEL): 800 GAL	02	243 *	98 *	L	1
Z01013	TRUCK UTILITY: ECV SHELTER/TROOP/CA	03	194 *	110 *	A	3
Z01013	TRUCK UTILITY: ECV SHELTER/TROOP/CA	04	194 *	110 *	A	2
G36237	GENERATOR SET DIESEL: 60HZ AC	05	30	23	X	1
T60081	TRUCK CARGO: 4X4 LMTV W/E	05	255	96	F	1
T96564	TRAILER FLAT BED: M1082 TRLR CARGO L	05	210	96	K	1
Z00958	TRK UTILITY COMMAND AND CONTROL IAI	05	194 *	110 *	A	2
C11158	CARRIER ARMORED COMMAND POST: FUI	06	202	105	T	1
C18234	CARRIER PERSONNEL FULL TRACKED: AF	06	204	100	T	1
G36237	GENERATOR SET DIESEL: 60HZ AC	06	30	23	X	1
T60081	TRUCK CARGO: 4X4 LMTV W/E	06	255	96	F	1
T96564	TRAILER FLAT BED: M1082 TRLR CARGO L	06	210	96	K	1
Z00958	TRK UTILITY COMMAND AND CONTROL IAI	06	194 *	110 *	A	2
T95992	LIGHT TACTICAL TRAILER: 3/4 TON	07	132	86	J	1
Z01013	TRUCK UTILITY: ECV SHELTER/TROOP/CA	07	194 *	110 *	A	2
T95992	LIGHT TACTICAL TRAILER: 3/4 TON	08	132	86	J	1
Z01013	TRUCK UTILITY: ECV SHELTER/TROOP/CA	08	194 *	110 *	A	2

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T38844	TRUCK AMBULANCE: 4 LITTER ARMD 4X4	09	205	102	A	2
G36237	GENERATOR SET DIESEL: 60HZ AC	10	30	23	X	1
T60081	TRUCK CARGO: 4X4 LMTV W/E	10	255	96	F	1
T96564	TRAILER FLAT BED: M1082 TRLR CARGO L	10	210	96	K	1
Z00958	TRK UTILITY COMMAND AND CONTROL IAI	10	194 *	110 *	A	2
Z00958	TRK UTILITY COMMAND AND CONTROL IAI	11	194 *	110 *	A	1

63357G000 2 FSC, EN BN

<u>LIN</u>	<u>LIN Description</u>	<u>Paragraph</u>	<u>Length (Inches)</u>	<u>Width (Inches)</u>	<u>T/C Code</u>	<u>Quantity</u>
G42238	GEN SET DED TM: 5KW 60HZ MTD ON M11	01	147	84	K	1
T61908	TRUCK CARGO: MTV W/E	01	278	96	G	1
Z00958	TRK UTILITY COMMAND AND CONTROL IAI	01	194 *	110 *	A	1
Z01013	TRUCK UTILITY: ECV SHELTER/TROOP/CA	01	194 *	110 *	A	1
Z36683	TRAILER TANK WATER (CAMEL): 800 GAL	01	243 *	98 *	L	1
C27633	CONTAINERIZED KITCHEN: CK	02	240	96	X	1
G36237	GENERATOR SET DIESEL: 60HZ AC	02	30	23	X	1
G74711	GEN SET: DED SKID MTD 10KW 60HZ	02	62	32	X	1
L28351	KITCHEN FIELD TRAILER MOUNTED: MTD	02	171	92	K	1
T61908	TRUCK CARGO: MTV W/E	02	278	96	G	3
T93761	TRAILER: PALLETIZED LOADING 8X20	02	306	96	M	2
T95992	LIGHT TACTICAL TRAILER: 3/4 TON	02	132	86	J	4
T96496	TRUCK CARGO: TACTICAL 8X8 HEAVY EXF	02	401	96	D	2
Z00206	MULTI-TEMPERATURE REFRIGERATED CC	02	96 *	240 *	X	2
Z00375	ASSAULT KITCHEN: (AK)	02	324	86	K	4
Z01013	TRUCK UTILITY: ECV SHELTER/TROOP/CA	02	194 *	110 *	A	4
Z36683	TRAILER TANK WATER (CAMEL): 800 GAL	02	243 *	98 *	L	3
G42238	GEN SET DED TM: 5KW 60HZ MTD ON M11	03	147	84	K	1
Z00958	TRK UTILITY COMMAND AND CONTROL IAI	03	194 *	110 *	A	1
T93761	TRAILER: PALLETIZED LOADING 8X20	04	306	96	M	4
T96496	TRUCK CARGO: TACTICAL 8X8 HEAVY EXF	04	401	96	D	4
T32629	TANK: LIQUID STORAGE	05	300 *	106 *	L	3
T58161	TRUCK TANK: FUEL SERVICING 2500 GALL	05	401	96	P	1
T87243	TRUCK TANK: FUEL SERVICING 2500 GALL	05	401	96	P	4
T93761	TRAILER: PALLETIZED LOADING 8X20	05	306	96	M	1
T96496	TRUCK CARGO: TACTICAL 8X8 HEAVY EXF	05	401	96	D	2
Z00958	TRK UTILITY COMMAND AND CONTROL IAI	06	194 *	110 *	A	1
G42170	GEN SET DED TM: 10KW 60HZ MTD ONM11	07	147	84	K	1
T61908	TRUCK CARGO: MTV W/E	07	278	96	G	1
T95555	TRAILER CARGO: MTV W/DROPSIDES M10	07	232	96	K	1
Z01013	TRUCK UTILITY: ECV SHELTER/TROOP/CA	07	194 *	110 *	A	2
Z94560	TRUCK VAN: EXPANSIBLE MTV W/E	07	337	96	C	1
F64544	FORWARD: REPAIR SYSTEM (FRS)	08	431	96	D	1
G53778	GENERATOR SET DIESEL ENGINE TM: PU-	08	165	95	L	4
G74711	GEN SET: DED SKID MTD 10KW 60HZ	08	62	32	X	1
H00654	HEATER: DUCT TYPE PORTABLE 350K BTL	08	65 *	72 *	J	2
H01907	ELECTRONIC SHOP SHELTER MOUNTED	08	159	94	X	3
T40999	TRUCK CARGO: HEAVY PLS TRANSPORTE	08	419	102	D	1
T41135	TRUCK CARGO: MTV W/E W/W	08	279	96	G	1
T60081	TRUCK CARGO: 4X4 LMTV W/E	08	255	96	F	1
T61908	TRUCK CARGO: MTV W/E	08	278	96	G	3
T93484	TRUCK VAN: LMTV W/E	08	264	96	F	1
T95555	TRAILER CARGO: MTV W/DROPSIDES M10	08	232	96	K	1
T96564	TRAILER FLAT BED: M1082 TRLR CARGO L	08	210	96	K	1
Z01013	TRUCK UTILITY: ECV SHELTER/TROOP/CA	08	194 *	110 *	A	3
T60081	TRUCK CARGO: 4X4 LMTV W/E	09	255	96	F	1
T63093	TRUCK WRECKER: TACTICAL 8X8 HEAVY	09	402	102	D	1
T94709	TRUCK WRECKER: MTV W/E W/W	09	360	96	C	1
W48391	SHOP EQUIPMENT: WELDING	09	190	91	K	1

Total Vehicles 135

\* Estimated value

Unit of Measure:  
SY

Trucks Assigned to Parking Area:

<u>T/C Code</u>	<u>LIN</u>	<u>Length (Feet)</u>	<u>Width (Feet)</u>	<u>Quantity</u>
T	C18234	17	8	1
A	Z00958	16	9	2
X	D82404	4	2	2
X	G36237	3	2	1

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F	T60081	21	8	1
G	T61908	23	8	1
A	Z00958	16	9	3
A	Z01013	16	9	2
A	Z01013	16	9	3
A	Z01013	16	9	2
X	G36237	3	2	1
F	T60081	21	8	1
A	Z00958	16	9	2
T	C11158	17	9	1
T	C18234	17	8	1
X	G36237	3	2	1
F	T60081	21	8	1
A	Z00958	16	9	2
A	Z01013	16	9	2
A	Z01013	16	9	2
A	T38844	17	9	2
X	G36237	3	2	1
F	T60081	21	8	1
A	Z00958	16	9	2
A	Z00958	16	9	1
G	T61908	23	8	1
A	Z00958	16	9	1
A	Z01013	16	9	1
X	C27633	20	8	1
X	G36237	3	2	1
X	G74711	5	3	1
G	T61908	23	8	3
D	T96496	33	8	2
X	Z00206	8	20	2
A	Z01013	16	9	4
A	Z00958	16	9	1
D	T96496	33	8	4
D	T96496	33	8	2
A	Z00958	16	9	1
G	T61908	23	8	1
A	Z01013	16	9	2
C	Z94560	28	8	1
D	F64544	36	8	1
X	G74711	5	3	1
X	H01907	13	8	3
D	T40999	35	9	1
G	T41135	23	8	1
F	T60081	21	8	1
G	T61908	23	8	3
F	T93484	22	8	1
A	Z01013	16	9	3
F	T60081	21	8	1
D	T63093	34	9	1
C	T94709	30	8	1
<b>Total Trucks</b>				<b>86</b>

## Trailers Assigned to Parking Area:

<u>T/C Code</u>	<u>LIN</u>	<u>Length (Feet)</u>	<u>Width (Feet)</u>	<u>Quantity</u>
J	T95992	11	7	1
K	T96564	18	8	1
L	Z36683	20	8	1
K	T96564	18	8	1
K	T96564	18	8	1
J	T95992	11	7	1
J	T95992	11	7	1
K	T96564	18	8	1
K	G42238	12	7	1
L	Z36683	20	8	1
K	L28351	14	8	1
M	T93761	26	8	2
J	T95992	11	7	4
K	Z00375	27	7	4
L	Z36683	20	8	3
K	G42238	12	7	1
M	T93761	26	8	4
L	T32629	25	9	3

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M	T93761	26	8	1
K	G42170	12	7	1
K	T95555	19	8	1
L	G53778	14	8	4
J	H00654	5	6	2
K	T95555	19	8	1
K	T96564	18	8	1
K	W48391	16	8	1
<b>Total Trailers</b>				<b>44</b>

**Parking Layout Details:**

5 POL Trucks are present in this unit.  
 No POL Semitrailers are present in this unit.  
 No truck or trailer mounted Tank & Pump Units are present in this unit.  
 These units and the trucks (T/C codes F & G) and trailers (T/C codes W, Y, & Z) used to carry them will be parked in the POL vehicle area.

**POL Parking Area**

Row #	Spaces	# Circulation Lanes	Length (Feet)	Max Space Length (Feet)
1	5	2	135	40

The number of tactical vehicles and major equipment in the planning base for organizational parking (category code 85210) plus the number of combat vehicles, radars, and major weapons systems in the planning base for vehicle storage sheds (category code 44262) equals the total number of major pieces of equipment for which space is provided in the maintenance complex. This is not equal to the total number of parking spaces, due to factors such as vehicle storage sheds in Europe and Korea, the pairing of trucks and trailers in single parking spaces based on pavement optimization, the diversion of Class IX storage vans to the area around the shop where they are easily accessible by maintenance personnel, and the mounting of TPUs on trucks or trailers, etc.

**Parking Rows**

Row #	Spaces	Length (Feet)	Max Space Length (Feet)
1	25	348	25
2	28	349	18
3	25	339	18
4	25	340	27
5	25	334	38

**Access Lanes**

Lane #	Lane Width (Feet)
1	45
2	30
3	45

**Parking Area Layout**

Truck T/C Code	Trailer T/C Code	Truck LIN	Trailer LIN	Space Length (Feet)	Space Width (Feet)	Number of Spaces
----- Row 1 -----						
G		T61908		25	11	1
F		T60081		23	11	1
F		T60081		23	11	1
F		T60081		23	11	1
F		T60081		23	11	1
	L		Z36683	22	11	1
	K		T96564	20	11	1
	K		T96564	20	11	1
	K		T96564	20	11	1
	K		T96564	20	11	1
A		T38844		19	12	1
T		C11158		19	12	1
A		T38844		19	12	1
T		C18234		19	11	1
T		C18234		19	11	1
A		Z01013		18	12	1
A		Z01013		18	12	1
A		Z01013		18	12	1

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A		Z01013		18	12	1
A		Z01013		18	12	1
A		Z00958		18	12	1
A		Z00958		18	12	1
A		Z01013		18	12	1
A		Z00958		18	12	1
A		Z00958		18	12	1

## ----- Row 2 -----

A		Z01013		18	12	1
A		Z00958		18	12	1
A		Z00958		18	12	1
A		Z01013		18	12	1
A		Z01013		18	12	1
A		Z01013		18	12	1
A		Z01013		18	12	1
A		Z00958		18	12	1
A		Z00958		18	12	1
A		Z00958		18	12	1
A		Z00958		18	12	1
A		Z00958		18	12	1
A		Z00958		18	12	1
A		Z00958		18	12	1
	J		T95992	13	10	1
	J		T95992	13	10	1
	J		T95992	13	10	1
X		D82404		6	5	1
X		D82404		6	5	1
X		G36237		5	5	1
X		G36237		5	5	1
X		G36237		5	5	1
X		G36237		5	5	1
X		G36237		5	5	1
X		G36237		5	5	1
X		G74711		7	6	1
X		G74711		7	6	1
X		Z00206		10	23	1
X		Z00206		10	23	1
	J		T95992	13	10	1

## ----- Row 3 -----

	J		T95992	13	10	1
	J		T95992	13	10	1
	J		T95992	13	10	1
	K		G42170	14	10	1
	K		G42238	14	10	1
	K		G42238	14	10	1
X		H01907		15	11	1
X		H01907		15	11	1
X		H01907		15	11	1
	L		G53778	16	11	1
	L		G53778	16	11	1
	L		G53778	16	11	1
	K		L28351	16	11	1
	L		G53778	16	11	1
	K		W48391	18	11	1
A		Z01013		18	12	1
A		Z01013		18	12	1
A		Z00958		18	12	1
A		Z00958		18	12	1
A		Z01013		18	12	1
A		Z01013		18	12	1
A		Z01013		18	12	1
A		Z01013		18	12	1
A		Z01013		18	12	1
A		Z01013		18	12	1

## ----- Row 4 -----

A		Z00958		18	12	1
	K		T96564	20	11	1
	K		T95555	21	11	1
	K		T95555	21	11	1
	L		Z36683	22	11	1
	L		Z36683	22	11	1
	L		Z36683	22	11	1
	L		Z36683	22	11	1
X		C27633		22	11	1

CatCode 852 10, Organizational

F		T60081		23	11	1
F		T60081		23	11	1
F		T93484		24	11	1
A	J	Z01013	H00654	24	12	1
A	J	Z01013	H00654	24	12	1
G		T61908		25	11	1
G		T61908		25	11	1
G		T61908		25	11	1
G		T61908		25	11	1
G		T61908		25	11	1
G		T61908		25	11	1
G		T61908		25	11	1
G		T61908		25	11	1
G		T41135		25	11	1
G		T61908		25	11	1
	L		T32629	27	12	1
	L		T32629	27	12	1
----- Row 5 -----						
	L		T32629	27	12	1
	M		T93761	28	11	1
	M		T93761	28	11	1
	M		T93761	28	11	1
	M		T93761	28	11	1
	M		T93761	28	11	1
	M		T93761	28	11	1
	M		T93761	28	11	1
	K		Z00375	29	10	1
	K		Z00375	29	10	1
	K		Z00375	29	10	1
	K		Z00375	29	10	1
C		Z94560		30	11	1
C		T94709		32	11	1
D		T96496		35	11	1
D		T96496		35	11	1
D		T96496		35	11	1
D		T96496		35	11	1
D		T96496		35	11	1
D		T96496		35	11	1
D		T96496		35	11	1
D		T96496		35	11	1
D		T63093		36	12	1
D		T40999		37	12	1
D		F64544		38	11	1

**Parking Area, Organizational Vehicles Allowance:**

Allowance = 16077 SY

Based On:

<u>Variable Name</u>	<u>Initial Value</u>
Organizational Vehicle Parking	9246
POL Allowance	1350
21410 Building Paved Apron	5229
21885 Building Paved Apron	0
21910 Building Paved Apron	0
44224 Org. Storage Bldg. Apron	252
44262 Vehicle Shed Apron	0

SECTION 01 57 20.00 10  
ENVIRONMENTAL PROTECTION

PART 1 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.

U.S. ARMY (DA)

AR 200-1 Environmental Protection and Enhancement

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1 (2008) Safety and Health Requirements  
Manual  
WETLAND MANUAL Corps of Engineers Wetlands Delineation  
Manual Technical Report Y-87-1

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

33 CFR 328 Definitions of Waters of the United States  
40 CFR 260 Hazardous Waste Management System: General  
40 CFR 261 Identification and Listing of Hazardous  
Waste  
40 CFR 262 Standards Applicable to Generators of  
Hazardous Waste  
40 CFR 279 Standards for the Management of Used Oil  
40 CFR 302 Designation, Reportable Quantities, and  
Notification  
40 CFR 355 Emergency Planning and Notification  
40 CFR 68 Chemical Accident Prevention Provisions  
49 CFR 171 - 178 Hazardous Materials Regulations

1.2 DEFINITIONS

1.2.1 Environmental Pollution and Damage

Environmental pollution and damage is the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade the environment aesthetically, culturally and/or historically.

### 1.2.2 Environmental Protection

Environmental protection is the prevention/control of pollution and habitat disruption that may occur to the environment during construction. The control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

### 1.2.3 Contractor Generated Hazardous Waste

Contractor generated hazardous waste means materials that, if abandoned or disposed of, may meet the definition of a hazardous waste. These waste streams would typically consist of material brought on site by the Contractor to execute work, but are not fully consumed during the course of construction. Examples include, but are not limited to, excess paint thinners (i.e. methyl ethyl ketone, toluene etc.), waste thinners, excess paints, excess solvents, waste solvents, and excess pesticides, and contaminated pesticide equipment rinse water.

### 1.2.4 Installation Pest Management Coordinator

Installation Pest Management Coordinator (IPMC) is the individual officially designated by the Installation Commander to oversee the Installation Pest Management Program and the Installation Pest Management Plan.

### 1.2.5 Land Application for Discharge Water

The term "Land Application" for discharge water implies that the Contractor must discharge water at a rate which allows the water to percolate into the soil. No sheeting action, soil erosion, discharge into storm sewers, discharge into defined drainage areas, or discharge into the "waters of the United States" must occur. Land Application must be in compliance with all applicable Federal, State, and local laws and regulations.

### 1.2.6 Surface Discharge

The term "Surface Discharge" implies that the water is discharged with possible sheeting action and subsequent soil erosion may occur. Waters that are surface discharged may terminate in drainage ditches, storm sewers, creeks, and/or "waters of the United States" and would require a permit to discharge water from the governing agency.

### 1.2.7 Waters of the United States

All waters which are under the jurisdiction of the Clean Water Act, as defined in 33 CFR 328.

### 1.2.8 Wetlands

Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, and bogs. Official determination of whether or not an area is classified as a wetland must be done in accordance with WETLAND MANUAL.

## 1.3 GENERAL REQUIREMENTS

Minimize environmental pollution and damage that may occur as the result of construction operations. The environmental resources within the project boundaries and those affected outside the limits of permanent work must be protected during the entire duration of this contract. Comply with all applicable environmental Federal, State, and local laws and regulations. Any delays resulting from failure to comply with environmental laws and regulations will be the Contractor's responsibility.

The Fort Lewis PW Environmental Management System (EMS) outlines procedures and provides guidance that addresses the operation, maintenance, support, and repair of facilities and infrastructure at Fort Lewis.

## 1.4 SUBCONTRACTORS

Ensure compliance with this section by subcontractors.

## 1.5 PAYMENT

No separate payment will be made for work covered under this section. Payment of fees associated with environmental permits, application, and/or notices obtained by the Contractor, and payment of all fines/fees for violation or non-compliance with Federal, State, Regional and local laws and regulations are the Contractor's responsibility. All costs associated with this section must be included in the contract price.

## 1.6 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in

accordance with Section 01 33 00 - SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Environmental Protection Plan; G, EC-TB-ET, PNM-PL-ER, FL-PW-ED

## 1.7 ENVIRONMENTAL PROTECTION PLAN

Prior to commencing construction activities or delivery of materials to the site, submit an Environmental Protection Plan (EPP) for review and approval by the Contracting Officer. Send a copy of the EPP to Fort Lewis Directorate of Public Works, Environmental Division. The purpose of the Environmental Protection Plan is to present a comprehensive overview of known or potential environmental issues which the Contractor must address during construction. Issues of concern must be defined within the Environmental Protection Plan as outlined in this section. Address each topic at a level of detail commensurate with the environmental issue and required construction task(s). Topics or issues which are not identified in this section, but are considered necessary, must be identified and discussed after those items formally identified in this section. Prior to submittal of the Environmental Protection Plan, meet with the Contracting Officer for the purpose of discussing the implementation of the initial Environmental Protection Plan; possible subsequent additions and revisions to the plan including any reporting requirements; and methods for administration of the Contractor's Environmental Plans. The Environmental Protection Plan must be current and maintained onsite by the Contractor.

### 1.7.1 Compliance

No requirement in this section will relieve the Contractor of any applicable Federal, State, and local environmental protection laws and regulations. During Construction, the Contractor will be responsible for identifying, implementing, and submitting for approval any additional requirements to be included in the Environmental Protection Plan.

### 1.7.2 Contents

Include in the environmental protection plan, but not limit it to, the following.

- a. Name(s) of person(s) within the Contractor's organization who is(are) responsible for ensuring adherence to the Environmental Protection Plan.
- b. Name(s) and qualifications of person(s) responsible for manifesting hazardous waste to be removed from the site, if applicable.
- c. Name(s) and qualifications of person(s) responsible for training the

Contractor's environmental protection personnel.

d. Description of the Contractor's environmental protection personnel training program.

e. An erosion and sediment control plan which identifies the type and location of the erosion and sediment controls to be provided. The plan must include monitoring and reporting requirements to assure that the control measures are in compliance with the erosion and sediment control plan, Federal, State, and local laws and regulations. A Storm Water Pollution Prevention Plan (SWPPP) may be substituted for this plan.

f. Drawings showing locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on the site.

g. Traffic control plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather. Plan shall include measures to minimize the amount of mud transported onto paved public roads by vehicles or runoff.

h. Work area plan showing the proposed activity in each portion of the area and identifying the areas of limited use or nonuse. Plan should include measures for marking the limits of use areas including methods for protection of features to be preserved within authorized work areas.

i. Drawing showing the location of borrow areas.

j. Include in the spill control plan the procedures, instructions, and reports to be used in the event of an unforeseen spill of a substance regulated by 40 CFR 68, 40 CFR 302, 40 CFR 355, and/or regulated under State or Local laws and regulations. The spill control plan supplements the requirements of EM 385-1-1 and AR 200-1. Include in this plan, as a minimum.

1. The name of the individual who will report any spills or hazardous substance releases and who will follow up with complete documentation. This individual will immediately notify the Contracting Officer in addition to the legally required Federal, State, and local reporting channels (including the National Response Center 1-800-424-8802) if a reportable quantity is released to the environment. Include in the plan a list of the required reporting channels and telephone numbers.

2. The name and qualifications of the individual who will be responsible for implementing and supervising the containment and cleanup.
  3. Training requirements for Contractor's personnel and methods of accomplishing the training.
  4. A list of materials and equipment to be immediately available at the job site, tailored to cleanup work of the potential hazard(s) identified.
  5. The names and locations of suppliers of containment materials and locations of additional fuel oil recovery, cleanup, restoration, and material-placement equipment available in case of an unforeseen spill emergency.
  6. The methods and procedures to be used for expeditious contaminant cleanup.
- k. A nonhazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris and schedules for disposal.
1. Identify any subcontractors responsible for the transportation and disposal of solid waste. Submit licenses or permits for solid waste disposal sites that are not a commercial operating facility.
  2. Evidence of the disposal facility's acceptance of the solid waste must be attached to this plan during the construction. Attach a copy of each of the Nonhazardous Solid Waste Diversion Reports to the disposal plan. Submit the report for the previous quarter on the first working day after the first quarter that nonhazardous solid waste has been disposed and/or diverted (e.g. the first working day of January, April, July, and October).
  3. Indicate in the report the total amount of waste generated and total amount of waste diverted in cubic yards or tons along with the percent that was diverted.
  4. A recycling and solid waste minimization plan with a list of measures to reduce consumption of energy and natural resources. Detail in the plan the Contractor's actions to comply with and to participate in Federal, State, Regional, and local government sponsored recycling programs to reduce the volume of solid waste at the source.

m. An air pollution control plan detailing provisions to assure that dust, debris, materials, trash, etc., do not become air borne and travel off the project site.

n. A contaminant prevention plan that identifies potentially hazardous substances to be used on the job site; identifies the intended actions to prevent introduction of such materials into the air, water, or ground; and details provisions for compliance with Federal, State, and local laws and regulations for storage and handling of these materials. In accordance with EM 385-1-1, a copy of the Material Safety Data Sheets (MSDS) and the maximum quantity of each hazardous material to be onsite at any given time must be included in the contaminant prevention plan. Update the plan as new hazardous materials are brought onsite or removed from the site.

o. A wastewater management plan that identifies the methods and procedures for management and/or discharge of wastewaters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines. If a settling/retention pond is required, the plan must include the design of the pond including drawings, removal plan, and testing requirements for possible pollutants. If land application will be the method of disposal for the wastewater, the plan must include a sketch showing the location for land application along with a description of the pretreatment methods to be implemented. If surface discharge will be the method of disposal, include a copy of the permit and associated documents as an attachment prior to discharging the wastewater. If disposal is to a sanitary sewer, the plan must include documentation that the Wastewater Treatment Plant Operator has approved the flow rate, volume, and type of discharge.

p. A historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands known to be on the project site and/or identifies procedures to be followed if historical archaeological, cultural resources, biological resources and wetlands not previously known to be onsite or in the area are discovered during construction. Include in the plan methods to assure the protection of known or discovered resources, identifying lines of communication between Contractor personnel and the Contracting Officer.

### 1.7.3 Appendix

Attach to the Environmental Protection Plan, as an appendix, copies of all environmental permits, permit application packages, approvals to construct, notifications, certifications, reports, and termination documents.

### 1.8 PROTECTION FEATURES

This paragraph supplements the Contract Clause PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS. Prior to start of any onsite construction activities, the Contractor and the Contracting Officer will make a joint condition survey. Immediately following the survey, the Contractor will prepare a brief report including a plan describing the features requiring protection under the provisions of the Contract Clauses, which are not specifically identified on the drawings as environmental features requiring protection along with the condition of trees, shrubs and grassed areas immediately adjacent to the site of work and adjacent to the Contractor's assigned storage area and access route(s), as applicable. This survey report will be signed by both the Contractor and the Contracting Officer upon mutual agreement as to its accuracy and completeness. The Contractor must protect those environmental features included in the survey report and any indicated on the drawings, regardless of interference which their preservation may cause to the work under the contract.

### 1.9 SPECIAL ENVIRONMENTAL REQUIREMENTS

Comply with the special environmental requirements listed in FL 200-1.

### 1.10 ENVIRONMENTAL ASSESSMENT OF CONTRACT DEVIATIONS

Any deviations from the drawings, plans and specifications, requested by the Contractor and which may have an environmental impact, will be subject to approval by the Contracting Officer and may require an extended review, processing, and approval time. The Contracting Officer reserves the right to disapprove alternate methods, even if they are more cost effective, if the Contracting Officer determines that the proposed alternate method will have an adverse environmental impact.

### 1.11 NOTIFICATION

The Contracting Officer will notify the Contractor in writing of any observed noncompliance with Federal, State or local environmental laws or regulations, permits, and other elements of the Contractor's Environmental Protection plan. After receipt of such notice, the Contractor will inform the Contracting Officer of the proposed corrective action and take such action when approved by the Contracting Officer. The Contracting Officer may issue an order stopping all or part of the work until satisfactory

corrective action has been taken. No time extensions will be granted or equitable adjustments allowed for any such suspensions. This is in addition to any other actions the Contracting Officer may take under the contract, or in accordance with the Federal Acquisition Regulation or Federal Law.

## PART 2 PRODUCTS (NOT USED)

## PART 3 EXECUTION

### 3.1 ENVIRONMENTAL PERMITS AND COMMITMENTS

Obtaining and complying with all environmental permits and commitments required by Federal, State, Regional, and local environmental laws and regulations is the Contractor's responsibility. Permitted work shall be in accordance with the associated permit. Copies of the permits shall be submitted to the Contracting Officer and Fort Lewis Public Works (ED) and must be in sufficient time to allow for review and revision with ultimate submittal at least 10 days before NTP for the associated permitted activity. Copies of permit amendments shall also be provided to the Contracting Officer and PW-ED. The Contractor shall be responsible for determining fee basis and paying all filing fees. All permit applications must indicate the following address as the building owner:

Ft. Lewis Public Works  
ATTN: IMNW-LEW-PWE MS17  
Box 339500 (BLDG. 2012)  
Fort Lewis, WA 98433-9500

### 3.2 LAND RESOURCES

Confine all activities to areas defined by the drawings and specifications. Identify any land resources to be preserved within the work area prior to the beginning of any construction. Do not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, topsoil, and land forms without approval, except in areas indicated on the drawings or specified to be cleared. Ropes, cables, or guys will not be fastened to or attached to any trees for anchorage unless specifically authorized. Provide effective protection for land and vegetation resources at all times, as defined in the following subparagraphs. Remove stone, soil, or other materials displaced into uncleared areas.

#### 3.2.1 Work Area Limits

Mark the areas that need not be disturbed under this contract prior to

commencing construction activities. Mark or fence isolated areas within the general work area which are not to be disturbed. Protect monuments and markers before construction operations commence. Where construction operations are to be conducted during darkness, any markers must be visible in the dark. The Contractor's personnel must be knowledgeable of the purpose for marking and/or protecting particular objects.

### 3.2.2 Landscape

Trees, shrubs, vines, grasses, land forms and other landscape features indicated and defined on the drawings to be preserved must be clearly identified by marking, fencing, or wrapping with boards, or any other approved techniques. Restore landscape features damaged or destroyed during construction operations outside the limits of the approved work area.

### 3.2.3 Erosion and Sediment Controls

Providing erosion and sediment control measures in accordance with Federal, State, and local laws and regulations is the Contractor's responsibility. The erosion and sediment controls selected and maintained by the Contractor shall be such that water quality standards are not violated as a result of construction activities. The area of bare soil exposed at any one time by construction operations should be kept to a minimum. Construct or install temporary and permanent erosion and sediment control with best management practices (BMPs) as specified in Section 01 57 23 - TEMPORARY STORM WATER POLLUTION CONTROL. BMPs may include, but not be limited to, vegetation cover, stream bank stabilization, slope stabilization, silt fences, construction of terraces, interceptor channels, sediment traps, inlet and outfall protection, diversion channels, and sedimentation basins. The Contractor's best management practices must also be in accordance with the National Pollutant Discharge Elimination System (NPDES) Ft. Lewis Construction General Permit and the Washington State Department of Ecology's Storm Water Management Manual for Western Washington. Remove any temporary measures after the area has been stabilized.

Permanent erosion and sediment control treatment facilities, such as biofiltration swales, rain gardens and infiltration basins, shall be constructed as shown on the drawings. Drainage to the permanent treatment facilities shall not be allowed during construction unless it complies with the SMMWW. Requirements of the SMMWW include diversion of runoff during construction from the permanent treatment facilities or if construction runoff is allowed to drain towards permanent treatment facilities then initial excavation shall not be closer than 1 foot of final elevation of permanent treatment facilities and final excavation to final grade shall not be allowed until after all disturbed areas upgradient have been permanently stabilized.

### 3.2.4 Lead-contaminated soil

Lead contamination is present in the topsoil in the approximate locations identified on Civil Drawing SITE-CD101. This contamination is from the uncontained demolition of buildings containing lead-based paint. The contamination is assumed to be classified as non-hazardous per EPA hazardous waste regulations. Where designated on Plate, SITE-CD101, remove the top 6 inches of soil and segregate/stockpile and sample the soil for both total lead and TCLP lead. If it is found to be non-hazardous lead contaminated soil (total lead greater than 250 mg/kg, and TCLP lead less than 5 mg/L), re-use on-site as fill where appropriate or deliver to a designated location on Fort Lewis per the Contracting Officer. Designated location will be within 15 miles of the project site.

If soil is re-used on site, it must be at 6 inches or more below grade. Adhere to all federal, state, and local standards and regulations pertaining to this removal. In areas within a critical root zone of an existing tree, remove the soil to a depth of 3 inches. The outermost limits of the critical root zone shall be marked on the ground with spray paint to accurately define the area.

If total lead results are less than 250 mg/kg, and TCLP lead is less than 5 mg/L then examine soil for paint chips. If soil is contaminated with paint chips, it may only be used below grade as described for soil re-use in previous paragraph (6 inches or more below grade), or must be removed to a location designated by the Contracting Officer. If there are no paint chips, and soil is less than 250 mg/kg and TCLP lead is less than 5 mg/L, then there is no environmental restriction for site re-use, as appropriate. Contact the Contracting Officer if sampling analysis during removal indicates hazardous levels of lead contamination (TCLP lead greater than 5 mg/L)

### 3.2.5 Possible petroleum-contaminated soil

Subsurface soil near former buildings B0910 (NW corner of 6th & F streets) and B0510 (NW corner of 1st & F streets) may contain petroleum-contaminated soil (PCS) deeper than 7 feet below-ground surface. Contact the Contracting Officer if PCS is encountered during excavation in either of these areas.

### 3.2.6 Contractor Facilities and Work Areas

Place field offices, staging areas, stockpile storage, and temporary buildings in areas designated on the drawings or as directed by the Contracting Officer. Temporary movement or relocation of Contractor facilities will be made only when approved. Erosion and sediment controls

must be provided for onsite borrow and spoil areas to prevent sediment from entering nearby waters. Temporary excavation and embankments for plant and/or work areas must be controlled to protect adjacent areas.

### 3.3 WATER RESOURCES

Monitor all water areas affected by construction activities to prevent pollution of surface and ground waters. Do not apply toxic or hazardous chemicals to soil or vegetation unless otherwise indicated. For construction activities immediately adjacent to impaired surface waters, the Contractor must be capable of quantifying sediment or pollutant loading to that surface water when required by State or Federally issued Clean Water Act permits.

#### 3.3.1 Wetlands

Do not enter, disturb, destroy, or allow discharge of contaminants into any wetlands.

#### 3.3.2 Monitoring Wells

Monitoring wells may be encountered during construction activities. Any monitoring wells encountered during construction activities shall be protected against damage. If any monitoring well is damaged in any way, it shall be repaired at the Contractor's expense. Contact the Contracting Officer if a monitoring well is encountered.

### 3.4 AIR RESOURCES

Equipment operation, activities, or processes will be in accordance with all Federal, State, and local air emission and performance laws and standards.

#### 3.4.1 Particulates

Dust particles; aerosols and gaseous by-products from construction activities; and processing and preparation of materials, such as from asphaltic batch plants; must be controlled at all times, including weekends, holidays and hours when work is not in progress. Maintain excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, spoil areas, borrow areas, and other work areas within or outside the project boundaries free from particulates which would cause the Federal, State, and local air pollution standards to be exceeded or which would cause a hazard or a nuisance. Sprinkling, chemical treatment of an approved type, baghouse, scrubbers, electrostatic precipitators or other methods will be permitted to control particulates in the work area.

Sprinkling, to be efficient, must be repeated to keep the disturbed area damp at all times. Provide sufficient, competent equipment available to accomplish these tasks. Perform particulate control as the work proceeds and whenever a particulate nuisance or hazard occurs. Comply with all State and local visibility regulations.

#### 3.4.2 Odors

Odors from construction activities must be controlled at all times. The odors must be in compliance with State regulations and/or local ordinances and may not constitute a health hazard.

#### 3.4.3 Sound Intrusions

Keep construction activities under surveillance and control to minimize environment damage by noise. Comply with the provisions of the State of Washington rules.

#### 3.4.4 Burning

Burning will not be allowed on the project site unless specified in other sections of the specifications or authorized in writing by the Contracting Officer. The specific time, location, and manner of burning will be subject to approval. Burning must completely reduce the materials to ashes.

### 3.5 CHEMICAL MATERIALS MANAGEMENT AND WASTE DISPOSAL

Disposal of wastes will be as directed below, unless otherwise specified in other sections and/or shown on the drawings. The Contractor is subject to all provisions of FL 200-1 and WAC 173-303. All material removed from Fort Lewis whether for reuse, disposal to a landfill or sent to a recycling facility, must be reported to the Pollution Prevention Office. Information must include amounts, types of material, and destination facility. POC for reporting is Ms. Stacy Randall (253)966-6470.

#### 3.5.1 Solid Wastes

Place solid wastes (excluding clearing debris) in containers which are emptied on a regular schedule. Handling, storage, and disposal must be conducted to prevent contamination. Employ segregation measures so that no hazardous or toxic waste will become co-mingled with solid waste. Transport solid waste off Government property and dispose of it in compliance with Federal, State, and local requirements for solid waste disposal. A Subtitle D RCRA permitted landfill will be the minimum acceptable offsite solid waste disposal option. Verify that the selected transporters and disposal facilities have the necessary permits and

licenses to operate.

### 3.5.2 Chemicals and Chemical Wastes

Dispense chemicals ensuring no spillage to the ground or water. Perform and document periodic inspections of dispensing areas to identify leakage and initiate corrective action. This documentation will be periodically reviewed by the Government. Collect chemical waste in corrosion resistant, compatible containers. Collection drums must be monitored and removed to a staging or storage area when contents are within 6 inches of the top. Wastes will be classified, managed, stored, and disposed of in accordance with Federal, State, and local laws and regulations.

### 3.5.3 Contractor Generated Hazardous Wastes/Excess Hazardous Materials

Hazardous wastes are defined in 40 CFR 261, or are as defined by applicable State and local regulations. Hazardous materials are defined in 49 CFR 171 - 178. At a minimum, manage and store hazardous waste in compliance with 40 CFR 262 in accordance with the Installation hazardous waste management plan. Take sufficient measures to prevent spillage of hazardous and toxic materials during dispensing. Segregate hazardous waste from other materials and wastes, protect it from the weather by placing it in a safe covered location, and take precautionary measures such as berming or other appropriate measures against accidental spillage. Storage, describing, packaging, labeling, marking, and placarding of hazardous waste and hazardous material in accordance with 49 CFR 171 - 178, State, and local laws and regulations is the Contractor's responsibility. Transport Contractor generated hazardous waste off Government property within 60 days in accordance with the Environmental Protection Agency and the Department of Transportation laws and regulations. Dispose of hazardous waste in compliance with Federal, State and local laws and regulations. Spills of hazardous or toxic materials must be immediately reported to the Contracting Officer and the Facility Environmental Office. Cleanup and cleanup costs due to spills are the Contractor's responsibility. The disposition of Contractor generated hazardous waste and excess hazardous materials are the Contractor's responsibility. Coordinate the disposition of hazardous waste with the Installation Hazardous Waste Manager and the Contracting Officer.

### 3.5.4 Fuel and Lubricants

Storage, fueling and lubrication of equipment and motor vehicles must be conducted in a manner that affords the maximum protection against spill and evaporation. Manage and store fuel, lubricants and oil in accordance with all Federal, State, Regional, and local laws and regulations. Used lubricants and used oil to be discarded must be stored in marked

corrosion-resistant containers and recycled or disposed in accordance with 40 CFR 279, State, and local laws and regulations. Storage of fuel on the project site is not allowed. Fuel must be brought to the project site each day that work is performed. Storage of fuel on the project site will be in accordance with all Federal, State, and local laws and regulations and FL200-1.

### 3.5.5 Wastewater

Disposal of wastewater will be as specified below.

a. Wastewater from construction activities, such as onsite material processing, concrete curing, foundation and concrete clean-up, water used in concrete trucks, forms, etc., will not be allowed to enter water ways or to be discharged prior to being treated to remove pollutants. Dispose of the construction related wastewater off-Government property in accordance with all Federal, State, Regional and Local laws and regulations.

b. Water generated from the flushing of lines after disinfection or disinfection in conjunction with hydrostatic testing will be discharged into the sanitary sewer with prior approval and/or notification to the Wastewater Treatment Plant's Operator.

### 3.6 RECYCLING AND WASTE MINIMIZATION

Participate in State and local government sponsored recycling programs. The Contractor is further encouraged to minimize solid waste generation throughout the duration of the project.

At least 50% of the project's non-hazardous construction and demolition debris shall be recycled and/or salvaged.

### 3.7 NONHAZARDOUS SOLID WASTE DIVERSION REPORT

Maintain an inventory of nonhazardous solid waste diversion and disposal of construction and demolition debris. Submit a report to PW-ED through the Contracting Officer on the first working day after each fiscal year quarter, starting the first quarter that nonhazardous solid waste has been generated. Include the following in the report.

a. Construction and Demolition (C&D) Debris Disposed = \_\_\_\_\_ in cubic yards or tons, as appropriate.

b. Construction and Demolition (C&D) Debris Recycled = \_\_\_\_\_ in cubic yards or tons, as appropriate.

c. Total C&D Debris Generated = \_\_\_\_\_ in cubic yards or tons, as appropriate.

d. Waste Sent to Waste-To-Energy Incineration Plant (This amount should not be included in the recycled amount) = \_\_\_\_\_ in cubic yards or tons, as appropriate.

### 3.8 HISTORICAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

Existing historical, archaeological, and cultural resources within the Contractor's work area are shown on the drawings. Protect these resources and be responsible for their preservation during the life of the Contract. If during excavation or other construction activities any previously unidentified or unanticipated historical, archaeological, and cultural resources are discovered or found, all activities that may damage or alter such resources will be suspended. Resources covered by this paragraph include but are not limited to: any human skeletal remains or burials; artifacts; shell, midden, bone, charcoal, or other deposits; rock or coral alignments, pavings, wall, or other constructed features; and any indication of agricultural or other human activities. Upon such discovery or find, immediately notify the Contracting Officer so that the appropriate authorities may be notified and a determination made as to their significance and what, if any, special disposition of the finds should be made. Cease all activities that may result in impact to or the destruction of these resources. Secure the area and prevent employees or other persons from trespassing on, removing, or otherwise disturbing such resources.

### 3.9 BIOLOGICAL RESOURCES

Minimize interference with, disturbance to, and damage to fish, wildlife, and plants including their habitat. The protection of threatened and endangered animal and plant species, including their habitat, is the Contractor's responsibility in accordance with Federal, State, Regional, and local laws and regulations.

### 3.10 OTHER ENVIRONMENTAL ISSUES

Other environmental issues (i.e., random underground storage tanks, transit piping, random transformer, etc.) may be encountered during construction activities. Contact the Contracting Officer if an environmental issue is encountered.

#### 3.10.1 Cement Asbestos Pipe

Disconnect and abandon in place existing cement asbestos pipe. Abandoned

asbestos-cement lines shall be removed in locations where they fall under building footprints.

### 3.11 INTEGRATED PEST MANAGEMENT

In order to minimize impacts to existing fauna and flora, the Contractor through the Contracting Officer, must coordinate with the Installation Pest Management Coordinator (IPMC) at the earliest possible time. Discuss integrated pest management strategies with the IPMC. Installation Project Office Pest Management personnel will be given the opportunity to be present at all meetings concerning treatment measures for pest or disease control.

### 3.12 PREVIOUSLY USED EQUIPMENT

Clean all previously used construction equipment prior to bringing it onto the project site. Ensure that the equipment is free from soil residuals, egg deposits from plant pests, noxious weeds, and plant seeds. Consult with the USDA jurisdictional office for additional cleaning requirements.

### 3.13 MAINTENANCE OF POLLUTION FACILITIES

Maintain permanent and temporary pollution control facilities and devices for the duration of the contract or for that length of time construction activities create the particular pollutant.

### 3.14 EMERGENCY UNEXPLODED ORDNANCE (UXO) RESPONSE

In the event that UXO, as defined in 40 CFR 260, is encountered during construction activities that are deemed to be a threat to human health or the environment, Ft. Lewis Military Police and EOD professionals shall be immediately contacted to conduct an emergency response. Additionally, immediately contact the Contracting Officer if UXO is encountered. Construction contractor personnel should stop work in the immediate vicinity of the discovery and maintain a safe distance from the item. Construction contractor should maintain flexibility in redirecting personnel and work effort in the event that items possessing an explosive hazard are discovered and construction personnel are excluded from areas during the destruction/removal process. An evaluation of this scenario and procedures, with contact numbers, shall be included in the health and safety plan (HASP) for the fieldwork.

### 3.15 TRAINING OF CONTRACTOR PERSONNEL

The Contractor's personnel must be trained in all phases of environmental protection and pollution control. Conduct environmental

protection/pollution control meetings for all personnel prior to commencing construction activities. Additional meetings must be conducted for new personnel and when site conditions change. Include in the training and meeting agenda: methods of detecting and avoiding pollution; familiarization with statutory and contractual pollution standards; installation and care of devices, vegetative covers, and instruments required for monitoring purposes to ensure adequate and continuous environmental protection/pollution control; anticipated hazardous or toxic chemicals or wastes, and other regulated contaminants; recognition and protection of archaeological sites, artifacts, wetlands, and endangered species and their habitat that are known to be in the area.

### 3.16 POST CONSTRUCTION CLEANUP

The Contractor will clean up all areas used for construction in accordance with Contract Clause: "Cleaning Up". Unless otherwise instructed in writing by the Contracting Officer, obliterate all signs of temporary construction facilities such as haul roads, work area, structures, foundations of temporary structures, stockpiles of excess or waste materials, and other vestiges of construction prior to final acceptance of the work. The disturbed area must be graded, filled and the entire area seeded unless otherwise indicated.

-- End of Section --

## SECTION 01 57 23

### TEMPORARY STORM WATER POLLUTION CONTROL

#### 1.0 GENERAL

##### 1.1 REFERENCES

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

##### ASTM INTERNATIONAL (ASTM)

ASTM D 4439	(2004) Geosynthetics
ASTM D 4491	(1999a; R 2004) Water Permeability of Geotextiles by Permittivity
ASTM D 4533	(2004) Trapezoid Tearing Strength of Geotextiles
ASTM D 4632	(1991; R 2003) Grab Breaking Load and Elongation of Geotextiles
ASTM D 4751	(2004) Determining Apparent Opening Size of a Geotextile
ASTM D 4873	(2002) Identification, Storage, and Handling of Geosynthetic Rolls and Samples

##### 1.2 GENERAL

The Contractor shall implement the storm water pollution prevention measures specified in this section in a manner which will meet the requirements of Section 01 57 20.00 10 ENVIRONMENTAL PROTECTION, and Section 01 10 00 STATEMENT OF WORK, Paragraph 6.3.3.1.

##### 1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 **SUBMITTAL PROCEDURES:**

**SD-07 Certificates**

### Mill Certificate or Affidavit;

Certificate attesting that the Contractor has met all specified requirements.

## 1.4 EROSION AND SEDIMENT CONTROLS

The controls and measures required by the Contractor are described below.

### 1.4 STABILIZATION PRACTICES

The stabilization practices to be implemented shall include shall be selected from Washington State Department of Ecology's Stormwater Management Manual for Western Washington Best Management Practices (BMPs). On his daily CQC Report, the Contractor shall record the dates when the major grading activities occur, (e.g., clearing and grubbing, excavation, embankment, and grading); when construction activities temporarily or permanently cease on a portion of the site; and when stabilization practices are initiated. Except as provided in paragraphs UNSUITABLE CONDITIONS and NO ACTIVITY FOR LESS THAN 21 DAYS, stabilization practices shall be initiated as soon as practicable, but no more than 14 days, in any portion of the site where construction activities have temporarily or permanently ceased.

#### 1.4.1 Unsuitable Conditions

Where the initiation of stabilization measures by the fourteenth day after construction activity temporarily or permanently ceases is precluded by unsuitable conditions caused by the snow cover or frozen ground, stabilization practices shall be initiated as soon as practicable after conditions become suitable.

#### 1.4.2 No Activity for Less Than 21 Days

Where construction activity will resume on a portion of the site within 21 days from when activities ceased (e.g., the total time period that construction activity is temporarily ceased is less than 21 days), then stabilization practices do not have to be initiated on that portion of the site by the fourteenth day after construction activity temporarily ceased. Except where stabilization is precluded by snow cover or frozen ground, or construction on a portion of the site is temporarily ceased, and earth disturbing activities will be resumed within 14 days, stabilization measures must be initiated as soon as practicable, but in no case more than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased.

#### 1.4.2 Structural Practices

Structural practices shall be implemented to divert flows from exposed soils, temporarily store flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Structural practices shall be implemented in a timely manner during the construction process to minimize erosion and sediment runoff. Structural practices shall include the following devices, when allowed by the Washington State Storm Water Management Manual.

## 1.5 SILT FENCES

The Contractor shall provide silt fences as a temporary structural practice to minimize erosion and sediment runoff. Silt fences shall be properly installed to effectively retain sediment immediately after completing each phase of work where erosion would occur in the form of sheet and rill erosion (e.g. clearing and grubbing, excavation, embankment, and grading). Silt fences shall be installed after approval by the Contracting Officer. Final removal of silt fence barriers shall be upon approval by the Contracting Officer.

## 1.6 STRAW BALES

The Contractor shall provide bales of straw as a temporary structural practice to minimize erosion and sediment runoff. Bales shall be properly placed to effectively retain sediment immediately after completing each phase of work (e.g., clearing and grubbing, excavation, embankment, and grading) in each independent runoff area (e.g., after clearing and grubbing in a area between a ridge and drain, bales shall be placed as work progresses, bales shall be removed/replaced/relocated as needed for work to progress in the drainage area). Areas where straw bales are to be used are shown on the drawings. Final removal of straw bale barriers shall be upon approval by the Contracting Officer. Rows of bales of straw shall be provided as follows:

- a. Along the downhill perimeter edge of all areas disturbed.
- b. Along the top of the slope or top bank of drainage ditches, channels, swales, etc. that traverse disturbed areas.
- c. Along the toe of all cut slopes and fill slopes of the construction areas.
  - d. Perpendicular to the flow in the bottom of existing drainage ditches, channels, swales, etc. that traverse disturbed areas or carry runoff from disturbed areas. Rows spacing shall be approved by the Contracting Officer.
  - e. Perpendicular to the flow in the bottom of new drainage ditches, channels, and swales. Rows spacing shall be approved by the Contracting Officer.
- f. At the entrance to culverts that receive runoff from disturbed areas.
- g. Any other location directed by Contracting Officer.

## 2.0 PRODUCTS

### 2.1 COMPONENTS FOR SILT FENCES

#### 2.1.1 Filter Fabric

The geotextile shall comply with the requirements of ASTM D 4439, and shall consist of polymeric filaments which are formed into a stable network such that filaments retain their relative positions. The filament shall consist of a long-chain synthetic polymer composed of at least 85 percent by weight of ester, propylene, or amide, and shall contain stabilizers and/or inhibitors added to the base plastic to make the filaments resistance to deterioration due to ultraviolet and heat exposure. Synthetic filter fabric shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of six months of expected usable construction life at a temperature range of 0 to 120 degrees F. The filter fabric shall meet the following requirements:

#### FILTER FABRIC FOR SILT SCREEN FENCE

PHYSICAL PROPERTY	TEST PROCEDURE	STRENGTH REQUIREMENT
Grab Tensile Elongation (%)	ASTM D 4632	100 lbs. min. 30 % max.
Trapezoid Tear	ASTM D 4533	55 lbs. min.
Permittivity	ASTM D 4491	0.2 sec-1
AOS (U.S. Std Sieve)	ASTM D 4751	20-100

#### 2.1.2 Silt Fence Stakes and Posts

The Contractor may use either wooden stakes or steel posts for fence construction. Wooden stakes utilized for silt fence construction, shall have a minimum cross section of 2 inches by 2 inches when oak is used and 4 inches by 4 inches when pine is used, and shall have a minimum length of 5 feet. Steel posts (standard "U" or "T" section) utilized for silt fence construction, shall have a minimum weight of 1.33 pounds per linear foot and a minimum length of 5 feet.

#### 2.1.3 Mill Certificate or Affidavit

A mill certificate or affidavit shall be provided attesting that the fabric and factory seams meet chemical, physical, and manufacturing requirements specified above. The mill certificate or affidavit shall specify the actual Minimum Average Roll Values and shall identify the fabric supplied by roll identification numbers. The Contractor shall submit a mill certificate or affidavit signed by a legally authorized official from the company manufacturing the filter fabric.

#### 2.1.4 Identification Storage and Handling

Filter fabric shall be identified, stored and handled in accordance with ASTM D 4873.

## 2.2 COMPONENTS FOR STRAW BALES

The straw in the bales shall be stalks from oats, wheat, rye, barley, rice, or from grasses such as Byhalia, Bermuda, etc., furnished in air dry condition. The bales shall have a standard cross section of 14 inches by 18 inches. All bales shall be either wire-bound or string-tied. The Contractor may use either wooden stakes or steel posts to secure the straw bales to the ground. Wooden stakes utilized for this purpose, shall have a minimum dimension of 2 inches x 2 inches in cross section and shall have a minimum length of 3 feet. Steel posts (standard "U" or "T" section) utilized for securing straw bales, shall have a minimum weight of 1.33 pounds per linear foot and a minimum length of 3 feet.

## 3.0 EXECUTION

### 3.1 INSTALLATION OF SILT FENCES

Silt fences shall extend a minimum of 16 inches above the ground surface and shall not exceed 34 inches above the ground surface. Filter fabric shall be from a continuous roll cut to the length of the barrier to avoid the use of joints. When joints are unavoidable, filter fabric shall be spliced together at a support post, with a minimum 6 inch overlap, and securely sealed. A trench shall be excavated approximately 4 inches wide and 4 inches deep on the upslope side of the location of the silt fence. The 4-inch by 4-inch trench shall be backfilled and the soil compacted over the filter fabric. Silt fences shall be removed upon approval by the Contracting Officer.

### 3.2 INSTALLATION OF STRAW BALES

Straw bales shall be placed in a single row, lengthwise on the contour, with ends of adjacent bales tightly abutting one another. Straw bales shall be installed so that bindings are oriented around the sides rather than along the tops and bottoms of the bales in order to prevent deterioration of the bindings. The barrier shall be entrenched and backfilled. A trench shall be excavated the width of a bale and the length of the proposed barrier to a minimum depth of 4 inches. After the bales are staked and chinked (gaps filled by wedging with straw), the excavated soil shall be backfilled against the barrier. Backfill soil shall conform to the ground level on the downhill side and shall be built up to 4 inches against the uphill side of the barrier. Loose straw shall be scattered over the area immediately uphill from a straw bale barrier to increase barrier efficiency. Each bale shall be securely anchored by at least two stakes driven through the bale. The first stake or steel post in each bale shall be driven toward the previously laid bale to force the bales together. Stakes or steel pickets shall be driven a minimum 18 inches deep into the ground to securely anchor the bales.

### 3.3 MAINTENANCE

The Contractor shall maintain the temporary and permanent vegetation, erosion and sediment control measures, and other protective measures in good and effective operating condition by performing routine inspections to determine condition and effectiveness, by restoration of destroyed vegetative cover, and by repair of erosion and sediment control measures and other

protective measures. The following procedures shall be followed to maintain the protective measures.

### 3.3.1 Silt Fence Maintenance

Silt fences shall be inspected in accordance with paragraph INSPECTIONS. Any required repairs shall be made promptly. Close attention shall be paid to the repair of damaged silt fence resulting from end runs and undercutting. Should the fabric on a silt fence decompose or become ineffective, and the barrier is still necessary, the fabric shall be replaced promptly. Sediment deposits shall be removed when deposits reach one-third of the height of the barrier. When a silt fence is no longer required, it shall be removed. The immediate area occupied by the fence and any sediment deposits shall be shaped to an acceptable grade.

### 3.3.2 Straw Bale Maintenance

Straw bale barriers shall be inspected in accordance with paragraph INSPECTIONS. Close attention shall be paid to the repair of damaged bales, end runs and undercutting beneath bales. Necessary repairs to barriers or replacement of bales shall be accomplished promptly. Sediment deposits shall be removed when deposits reach one-half of the height of the barrier. Bale rows used to retain sediment shall be turned uphill at each end of each row. When a straw bale barrier is no longer required, it shall be removed. The immediate area occupied by the bales and any sediment deposits shall be shaped to an acceptable grade.

### 3.3.3 Diversion Dike Maintenance

Diversion dikes shall be inspected in accordance with paragraph INSPECTIONS. Close attention shall be paid to the repair of damaged diversion dikes and necessary repairs shall be accomplished promptly. When diversion dikes are no longer required, they shall be shaped to an acceptable grade.

## 3.4 INSPECTIONS

### 3.4.1 General

The Contractor shall inspect disturbed areas of the construction site, areas used for storage of materials that are exposed to precipitation that have not been finally stabilized, stabilization practices, structural practices, other controls, and area where vehicles exit the site at least once every seven (7) calendar days OR at least once every (fourteen) 14 calendar days and within 24 hours of the end of any storm that produces 0.5 inches or more rainfall at the site. Where sites have been finally stabilized, such inspection shall be conducted at least once every month.

### 3.4.2 Inspections Details

Disturbed areas and areas used for material storage that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the drainage system.

Erosion and sediment control measures identified in the Storm Water Pollution Prevention Plan shall be observed to ensure that they are operating correctly. Discharge locations or points shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Locations where vehicles exit the site shall be inspected for evidence of offsite sediment tracking.

### 3.4.3 Inspection Reports

For each inspection conducted, the Contractor shall prepare a report summarizing the scope of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the Storm Water Pollution Prevention Plan, maintenance performed, and actions taken. The report shall be furnished to the Contracting Officer within 24 hours of the inspection as a part of the Contractor's daily CQC REPORT. A copy of the inspection report shall be maintained on the job site.

### 3.4.4 Monthly Inspection Report and Certification Form for Erosion and Sediment Controls

On the first working day of each month the Contractor shall complete, sign, and submit the original form to the State of Washington, Department of Ecology. On the first working day of each month the Contractor shall also furnish one copy of the form submitted to the Dept of Ecology, to the Contracting Officer as part of the Contractor's daily CQC Report and attach a copy of the completed form to the Plan. Unless otherwise notified by the Dept of Ecology, the Contractor shall submit the Monthly Inspection Report and Certification Forms for an additional two months after the final completion of all storm water pollution prevention measures required in this contract have been implemented.

End of Section

## Appendix JJ – Revisions to Sections

### Section 01 10 00

- 1) Paragraph 3.1.2 (8) (c) - Allow space and hookups for **two (2)** vending machines, **one (1)** refrigerator **with ice maker**, and microwave.
- 2) Paragraph 3.1.2 (9) - Vaults. All vault walls, floors and ceilings shall be constructed in compliance with appropriate requirements referenced below. Provision for a ~~user provided (GFGI)~~ GFCI intrusion detection system including motion detectors **(for arms vault only)** and all door alarms, ~~and camera~~ is required. Provisions shall include dedicated power circuits, communications connections, and raceways and signal wiring for IDS devices. System requirements shall be coordinated with the Installation Security Office.
- 3) Paragraph 3.1.2 (9) (a) - Weapons Storage Vault. Provide secure storage of weapons being repaired, especially vehicle-mounted weapons such as machine guns and firing port weapons. Weapons vault walls, floors and ceilings shall be constructed in compliance with AR 190-11, Physical Security of Arms, Ammunition, and Explosives. An option exists for use of prefabricated, modular vaults conforming to Fed. Spec AA-V-2737 requirements. Provide a GSA approved Class 5 Armory vault door with lock in accordance with Fed. Spec, AA-D-600D and a "Dutch door" style day gate. Provide an internal wire mesh partitioned space or provide space for GFGI lockable cabinets IAW installation requirements to accommodate armorer's tool kits, spare arms parts, machine gun barrels and major subassemblies. Coordinate arms rack anchor rings, common storage racks, etc with user. **Provide arms rack anchor rings on 3 walls of weapons vault.**
- 4) Paragraph 3.1.2 (12) (e) - Janitorial Spaces. Provide one janitorial space as shown on drawings with mop sink and heavy duty shelving. Expansion of the Janitorial Space to include a recycling function is optional. Provide a minimum of one (1) 48" mop rack with mop holders. Heavy duty shelving shall include a minimum of five wall-mounted shelves, 12" deep X 48" long, 12" on center vertically. First shelf to be 18" a.f.f.
- 5) Paragraph 3.1.4 (2) - Antiterrorism and Force Protection. Each project should be evaluated for security requirements in accordance with UFC 4-010-01. Minimum requirement is a security fence at the site perimeter consisting of 7-foot high chain link fabric plus a single outrigger with 3-strand barbed wire, designed in accordance with STD 872-90-03, FE-6, Chain-Link Security Fence Details. A zone cleared of trees and shrubs, 20 feet wide inside the fence and 10 feet wide outside the fence is required. The clear zone shall be gravel underlain by a synthetic fabric. The clear zone shall be treated with herbicides to discourage vegetative growth. Manually operated vehicular gates, approximately 30 feet wide overall, shall be provided at each vehicle entrance/exit. **A minimum of one (1) man-gate shall also be provided.**
- 6) Paragraph 3.1.6.12 - Fire Pump. ~~Refer to paragraph 3.1.9, Electrical and Communication Systems, for requirements.~~ **Provide fire pump if necessary based upon estimated flow and pressure required for the sprinkler system and criteria provide throughout RFP. Refer to Section 01 33 16 Paragraph 1.12.5.**
- 7) Paragraph 3.1.7 (2) (e) - Telecommunications Rooms and SIPRNet rooms will each be served by an independent and dedicated air-handling system. Air handing unit system

(s) shall not be floor-space mounted within the actual space served. Rooms shall be maintained at 72 degrees F and 50 percent humidity year-round. Assume 616 Watts per hour for the equipment heat dissipation for **SIPRNet Rooms and 1941 Watts for Telecommunication Rooms**. Contractor shall verify this load during the design stage.

- 8) Paragraph 3.1.9 (2) (i) ii. - Access Control System: ~~The access control system shall consist of proximity sensors throughout the facility with varying levels of security. System requirements shall be coordinate with the Installation Security Office.~~ None Required per the Installation Security Office.
- 9) Paragraph 3.1.9.4 (g) - Cable Television (CATV). A minimum of two CATV outlets shall be provided in the Break, Training, and Conference Room and Admin and Shop Control Room. The cable television system shall consist of cabling, pathways, and outlets. All building CATV systems shall conform to applicable criteria to include I3A technical Criteria and the UFC 3-580-01 Telecommunications Building Cabling Systems Planning Design. **CATV service for Joint Base Lewis-McChord shall not be located in NEC spaces. A separate room or closet is required for the CATV service. Due to the size of the facility, CATV service may be located in the electrical or mechanical closet.**
- 10) Paragraph 3.1.9.4 (i) - Security Infrastructure. The security infrastructure shall be installed to support ~~GFI-GFCI~~ equipment including ~~cameras, door alarms, and motion sensors~~ motion sensors for the arms vault only and all door alarms.
- 11) Paragraph 3.1.9.4 (i) i - Intrusion Detection and Security Systems. Provision for ~~user~~ GFCI provided ICIDS intrusion detection and security systems ~~are~~ is required for ~~secure and restricted areas including the arms vault, COMSEC vault, and SIPRNet room.~~ Provisions shall included dedicated power circuits, telecommunications connections, and raceways and signal wiring for user installed devices. System requirements shall be coordinated with the Installation Security Office.
- 12) Paragraph 3.1.9.4 (k) - Grounding: Each maintenance building shall have a ground grid around the building perimeter for grounding incoming service, building steel, lightning protection, telephone service, piping, and internal grounding requirements. Ground busbar shall be provided on walls of each repair area. A grounding point shall be provided in each repair area and each maintenance area. Each repair area and maintenance area is 16' x 32' in size. Grounding points shall be provided in vehicle and equipment parking areas on 40-foot centers (maximum) and coordinated parking layout. It will be acceptable to provide a minimum of one grounding point for every eight vehicles parked in a double row, and one grounding point for every four vehicles parking in a single row configuration. Equipment parking grounding shall be in accordance with the recommendations of MIL-HNBK-419A, which is reference in 13A. This includes, but is not limited to, the earth electrode subsystem ~~should~~ **shall** exhibit a resistance to earth of 10 ohms or less and multiple ground rods ~~should~~ **shall** be interconnected using 1/0 AWG bare copper cable. Install an interior #2 AWG bare tinned copper ground loop around the perimeter of the Fluid Distribution Room for dissipation of potential static charge. Bond ground loop to building structure and grounding riser. Provide thirty (30) #6 AWG bare copper pigtailed complete with alligator clips on both ends for grounding ring. Additional grounding may be provided based on project requirements. Systems shall conform to NFPA 70 National Electrical Code, NFPA 780 Standard for the Installation of Lightning Protection Systems, local codes and the Technical Criteria for Installation Information Infrastructure Architecture (I3A).

- 13) Paragraph 3.2 (e) - Architectural TEMF Features Matrix, Note 7. All Finishes **within the matrix** are considered minimum finishes only. **Provide anti-static sealant on TR bare concrete floors. Paint used on backboards shall be fire-retardant pain and shall not conceal the fire rating stamps located on the backboards.**
- 14) Paragraph 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 expectancy 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.
- 15) Paragraph 6.4.6.2 (e) - ~~Install a boot/equipment wash system. Discharge the boot was 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.~~ Not Used.
- 16) Paragraph 6.4.6.3 (c) - **ADD** (4) All remote fire department connections (FDC's) and post indicator valves (PIV's) shall be stenciled directly on the device with durable, weather resistant, non corrosive, permanent labeling that states the building number that the device is associated with.
- 17) Paragraph 6.4.6.3 (e) - The flow tests were conducted in the vicinity of the project sites and can be found in Appendix D. **The flow tests in Appendix D were included for bidding purposes only. As part of the design/engineering process, the design-build team shall verify conditions with their own independent flow test.** ~~Any additional flow testing will be the responsibility of the Contractor, if deemed necessary and for the portion of their respective development activity.~~ Conduct any additional water flow testing in accordance with NFPA 291, Recommended Practice for Fire-Flow Testing and Marking of Hydrants. Hydrant barrel shall be collared with two reflective metal backed collars and numbered 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).
- 18) Paragraph 6.4.6.4(c) - Propane Fuel Distribution System: JBLM owns and operates the propane 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. In addition, install yellow pipe with black striping in order to further distinguish the two facilities. **Install propane piping branching off of natural gas piping in the**

**mechanical room downstream of meter. Provide lock out isolation valve accessible in mechanical room. Penetrate mechanical room wall with piping above grade and then route piping below grade to back of sidewalk along the street.**

- 19) Paragraph 6.4.8.1 - Obtain borrow material from licensed and permitted sources off government property. Obtain all fill off post and at their expense. See ~~6.17.2~~ 6.17.1 for disposal of material.
- 20) Paragraph 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 drawing sin Appendix ~~C~~ "J". Restore the laydown areas to ~~its~~ **their** original condition after construction is complete.
- 21) Paragraph. 6.4.11.1 - Tree Preservation plan: Provide a Tree Preservation and Protection Plan to COE for approval before any clearing and grading can take place. The Tree Preservation Plan must follow JBLM Urban Forest Management requirements included in Appendices ~~P~~ "AA" and "BB" ~~Q~~.
- 22) Paragraph 6.5.3.3 (b) - ~~Beyond Security: POC: Julie Santie, 11420 Hwy 302 NW, Gig Harbor, WA 98329 (253) 720-7416. Not Used.~~
- 23) Paragraph 6.5.4 - **ADD** (d) Mount sign centered on exterior surface of exterior door indicating mechanical, electrical, and fire sprinkler riser rooms. Sign shall be a minimum of 20 x 15 inches, mounted 6 feet above grade, with red text on white background.
- 24) Paragraph 6.9.1.7 (a) - Transformer Specifications: Distribution transformers shall be new, loop-feed, ~~mineral oil-insulated~~ **FR3 fluid Bio-Preferred to comply with DOE rule 2**, complying with ANSI C57.12.26. Transformers shall be dead-front, equipped with current-limiting bayonet oil-immersed fuses, five primary taps (two-above and two-below nominal), and a load-break switch (or switches) to facilitate 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. 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. Provided insulated-bushing-type parking stands adjacent to each separable load-break elbow to provide for cable isolation. Provide pad-lock hasps and locks. Coordinate lock style and material with the Public Works Exterior Electrical Shop. Provide **5 feet tall, 12 inch concrete filled bollards** for protection in location vulnerable to vehicular traffic. **Bollard footings shall be designed to withstand organizational vehicular impact.**

**ADD:** 6.9.1.7 (a) i. Refer to DOE 2010 Efficiency Design Rule for transformers and distribution equipment, 10 CFR Part 431.3.
- 25) Paragraph 6.9.2.2 (a) - Coordinate new manhole/~~ductwork~~ **duct bank** requirements to ensure manhole vault is correctly sized, duct is the correct schedule rating, and is pointed in the right direction. (b) Contractor shall have a cabling/manhole coordination meeting with the COE, Contractor, and JBLM NEC Plans Branch prior to setting manholes and cable ~~ductwork~~ **duct bank**.

- 26) Paragraph 6.9.2.2 ADD (c) - Contractor shall meet with JBLM NEC during design to confirm labeling standards, required testing, and format of test results.
- 27) Paragraph 6.9.4.1 - General: Site grounding shall consist of a counterpoise grid system composed of 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 and **I3A criteria**.
- 28) Paragraph 6.10.2.1 - General: **Provided dedicated room or closet with telephone backboard for Quest and Comcast. Due to the size of the facility, CATV service may be located in the electrical or mechanical closet.** ~~Provide dedicated space on the telephone back board for Quest and Comcast.~~ Quest and Comcast will provide and install their entrance cables and make connections to their equipment. 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. Comcast and Quest will make the connections to their equipment. **All CAT6 cables that are installed in under-floor raceways shall be listed for use in a wet environment.**
- 29) Paragraph 6.10.2.2 - Provide a standard National Electric Code information outlet on the telephone backboard for connection to the Post EMCS. **Install I3A outlet with two (2) RJ45 connectors in double-gang box, one for voice and one for data, with two (2) CAT6 cables for connection to the Post EMCS.** Coordinate the outlet location with the Department of Public Works.
- 30) Paragraphs 6.10.4 Lighting and 6.10.4.1 - **ADD** Central Lighting Inverter: Provide a central lighting inverter per NFPA 101 sized for the facility egress lighting load and located in the main electrical room. Include self-test/self-diagnostic feature that automatically performs a minimum 30-second test and diagnostic routine at least every 30-days and indicates failures and alarms. Status, test, and alarm information shall be stored in memory and retrievable from the unit display, with provisions for remote alarm indication and condition monitoring from JBLM EMCS.
- 31) Paragraph 6.11.4.5 - Exhaust toilet rooms per ASHRAE 62.1, **most current version-2004.**
- 32) Paragraph 6.13.3 - **ADD** Locations of controls: All components of the fire alarm panel, transmitter, and sprinkler system risers, shall be installed at a convenient location for maintenance, inspection and testing acceptable to the authority having jurisdiction. Components shall not be installed above 6 ft on wall and a 36 inch clearance shall be maintained around components.
- 33) Paragraph 6.13.4 - **ADD** A Knox box shall be installed within six (6) feet of the main entrance door, on the left-hand side.

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- 34) Paragraph 3.9.1 – Revise Submittals for Information Systems Engineering Command (ISEC) to: Design Analyses & Specs (Full Sets/Partial Sets) to 1/1; Drawing Size-Half Size (Full Sets/Partial Sets) to 1/1.