RFP N62473-23-R-1012
C&I MACC

PTO 0001
BACHELOR ENLISTED QUARTERS
MCB SAN DIEGO, CA

PART 3

Project Program

1.0 PROJECT DESCRIPTION

Construct a multi-story bachelor housing complex for permanent party military personnel not to exceed 43,056 SF. The complex shall contain 80 Marine Corps 2+0 rooms along with required support spaces as outlined in the Project Program and RFP. Maximum occupancy shall be 160 enlisted military personnel. The facility shall be designed around enclosed interior corridors using the Room Plan layout attached with the RFP. Each Marine Corps 2+0 Room shall include a double occupancy living/sleeping area, a shared bathroom to include a toilet, vanity cabinet with countertop and lavatory, and shower compartment, a service area to include base and wall cabinets, countertop, sink and refrigerator, and two lockable individual closets.

Provide complete and fully operational Laundry for residents. Locate the Laundry on each floor centrally located complying with the requirements of FC 4-721-10N Navy and Marine Corps Unaccompanied Housing. The laundry must be close to the Duty Desk (Lobby Reception). The entry feeling is desirable to be open well-lit with natural and artificial lighting, high volume space with control heat building up. Consider angling windows away from orientation of the sun.

In addition to the individual sleeping rooms the facility shall include all spaces required in FC-4-721-10N to include but not limited to:

- Entrance vestibule
- Duty office with a private head
- A duty bunk room
- Multipurpose room/spaces
- Laundry room supporting commercial-grade washers and dryers
- Vending space
- Passenger/freight elevator
- Stair towers
- Interior corridors
- Janitor's closets
- Public restrooms
- Bulk storage
- Facility support spaces to include mechanical space, electrical space, telecommunications space, and fire protection space

Building materials, building systems and construction methods shall follow the requirements established in the Engineering System Requirements (ESR) of the Project Program and the Performance Technical Specifications (PTS) of this RFP.

2.0 PROJECT OBJECTIVES

2.1 Mission Statement

The Marine Corps mission for bachelor housing is to provide adequate barracks space and living amenities for all Marine and assigned Navy bachelor enlisted personnel. The goal is to achieve consistancy throughout the Marine Corps with facilities that promote professional development, support unit cohesion and improve the quality of life for all enlisted personnel. Thus the minimum standards set forth in this document maintain the focus of providing housing for a comfortable living environment.

2.2 Facility Function

The function of the Marine Corps 2+0 room Bachelor Housing quarters is to provide our unaccompanied military personnel with adequate, comfortable housing. This is a major goal for the Marine Corps, and a critical element in attracting and retaining high caliber personnel.

2.3 Project Specific Priorities

2.3.1 Sustainable Design and Construction

Design and construct project to comply with sustainability requirements identified in Part 2 UFGS Section 01 33 29, *Sustainability Requirements and Reporting*. Additional specific sustainability requirements are found in RFP Part 2, Part 3, and Part 4 sections.

Design and construct project in accordance with UFC 1-200-02, *High Performance and Sustainable Building Requirements*.

2.3.2 Storm Water Management - Low Impact Development (LID)

Comply with UFC 3-210-10, *Low Impact Development* and FC 1-300-09N *Navy and Marine Corps Design Procedures*. Additional specific LID and stormwater management requirements are found in RFP Parts 3 and 4, Section G30. In addition to LID, comply with State and Local stormwater regulations.

2.3.3 Energy Efficiency

Incorporate energy efficiency in accordance with UFC 1-200-02, *High Performance and Sustainable Building Requirements*.

2.3.4 Building Commissioning

Provide commissioning to meet requirements identified in Section 01 91 00.15 20 *Total Building Commissioning, and UFC 1-200-02 High Performance and Sustainable Building Requirements.*

2.3.5 Accessibility Requirements

Provide barrier-free design in accordance with UFC 1-200-01 , DoD Building Code (G*eneral Building Requirements)*. Provide the required 5% ABA/ADA rooms of the total rooms required

for the new BEQ.

2.3.6 Antiterrorism Criteria

Design the facility to comply with UFC 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings*.

Facility will be less than 3 stories and will not be required to meet the progressive collapse avoidance standards.

Facility is within a controlled perimeter.

Facility minimum standoff distance: See UFC 4-010-01, Table B-1.

Develop the site based on the requirements of UFC 4-010-01. Where conventional construction standoff distances are not available, the required level of protection can be achieved through analysis and building hardening based on the actual standoff distance. Blast analysis is required for all windows and doors and structural components and assemblies that are do not meet the conventional construction parameters in UFC 4-010-01,Table 2-3 or that are not listed in UFC 4-010-01, Table B-2.

2.4 Appropriate Design

Comply with the current version of FC 4-721-10N, *Navy and Marine Corps Unaccompanied Housing* for planning and design requirements at the time of award.
Design shall comply with the current version of UFC 3-101-01, *Architecture* at the time of award.
Contractor shall calculate the gross area following the criteria in this UFC. Accommodate air-handling units to minimize the impact in square footage.

Building Orientation to sun is very important to the efficiency of the mechanical system and utility consumption over the life of this facility. Architectural elements, materials and details will assist in achieving the sun control required, and is a critical part of this project final solution.

2.5 Workflow Process

The main building entrance and staff operations must be located central to the facility. Design the duty office to support efficient resident check-in with direct visual access to the main entrance. The shared public areas of the building must be centrally located on the first floor and in close proximity to vertical circulation. Locate the duty office adjacent to public areas to provide monitoring as much as practical. Sleeping wings must extend away from the central public areas equally as much as the design and site configuration will allow.

2.5.1 Hours Of Operation

Hours of operation shall be 24-hours a day, 7 days a week.

2.5.2 Staffing/Occupancy

The number of occupants specified in the RFP are identified for programming purposes. Determine occupancy used to design building features, such as structural, egress, and plumbing

fixtures as required in applicable building or life safety codes.

Type of Occupancy	No. of Persons	Description of Activity
BEQ	2 Staff	In charge of facility maintenance and operation.
	160 Military Personnel	Bachelor housing complex for permanent party military personnel.

2.6 Special Design Challenges

The contractor shall design and construct efficient pedestrian circulation that it is safe and visually pleasant. The design shall consider street trees, separation from traffic, seating areas, pavement design, lighting, and many other factors shall be incorporated in locations where pedestrian travel is accommodated and encouraged. Sidewalks require the following basic ingredients for success: adequate width of travel lanes, a buffer from the travel lane, curbing, minimum width, gentle cross-slope (2 percent or less), adequate sight distances around corners and at driveways, distances to walls and other structures, a clear path of travel free of street furniture, continuity, a well-maintained condition, ramps at corners, and flat areas across driveways.

The final site layout shall have a clear flow and distances from the facilities to the amenities areas shall provide a pleasant walk as well as areas for passive use. Avoid narrow and long sidewalks.

Contractor shall maximize living room area within the allowable square footage following the criteria in FC 4-721-10N, *Navy and Marine Corps Unaccompanied Housing*, and UFC 3-101-01, *Architecture*.

3.0 SITE ANALYSIS

3.1 Existing Site Conditions

3.1.1 Natural Constraints

The site is a previously developed area, generally flat, but with a storm water retention basin along the west side, and a slope along the north side.

3.1.2 Man-Made Constraints

See the project site drawing in Part 6 Attachment A for existing site conditions and utilities.

3.2 Site Development Requirements

3.2.1 Facility Footprint

Attachment A in Part 6 identifies the general area available for building construction.

3.2.2 Vehicular Access and Circulation

Access to the site will be along an existing road on the north side of the project site, as shown on Attachment A in Part 6. Additional access may be provided through the existing parking lot on the east side of the project side. A drive-up/drop-off area is required, as is access for maintenance and delivery vehicles. No resident or staff parking is required.

3.2.3 Site Support Facilities

Provide the following site support facilities within the project footprint:

- Dumpster pad and enclosure for two dumpsters
- Horseshoe pits
- Covered picnic area
- Equipment washdown area
- Equipment drying area

See ESR G20 for additional information.

4.0 BUILDING REQUIREMENTS

4.1 Space Tabulation

Follow FC 4-721-10N for design parameters and facility functions.

4.2 Space Relationships

The main building entrance and staff operations area shall be located central to the facility. The Duty Office and Reception area shall be designed to support efficient check-in with direct visual access to the main entrance. The shared public areas of the building shall be centrally located and in close proximity to vertical circulation. The Duty area shall be located adjacent public areas to provide monitoring of user activities. Provide a design analysis for the duty office and front desk/reception which captures activities such as check-in, control and administration of BEQ operations.

Community facilities shall be incorporated into the BEQ building. Complete, separate community core areas are required for the BEQ.

Living units should extend away from, but be within a close walking proximity to, the central core areas.

Innovative designs are encouraged that include space relationships as required per FC 4-721-10N. Other than physical connections as described between Lounge, Laundry and Duty area, building portions may be connected or separated as needed based on site configuration and preferred building massing. In the design, consider overall facility functionality, security, efficient pedestrian access, circulation, and cost effectiveness maximizing living rooms and not exceeding the allowable square footage.

4.3 Exterior Character

The primary exterior material of the building shall be split-faced concrete masonry unit with integral color. The roof shall be standing-seam metal roof.

5.0 ROOM REQUIREMENTS

The room/spaces listed below do not include all rooms/spaces listed in **FC 4-721-10N.** Contractor shall provide all spaces included in the FC mentioned herein. The rooms listed below includes criteria beyond the requirements stipulated in the FC, and other sections of this RFP. If there are any contradictions, the most stringent requirement shall apply.

Information in Room Requirements are provided to the DOR for guidance to achieve the desired architectural layout and interest goals. During the de sign phase NAVFAC and the DOR will provide additional rooms/areas as required for a complete functional building program on the final design. Refer to ESR's for additional information.

Living Unit

Space Characteristics	
• The standard Living Room can accommodate two occupants. The standard room configuration shall be in conformance with all RFP requirements and Layout per FC 4-721-10N, figure B-7. • The Living/Sleeping room shall be provided with 180SF net area minimum. Designer of Record shall coordinate closely with Mechanical engineer/designer at concept design stages to ascertain that adequate space provided for the installation of continuous fresh air supply air ducts and continuous exhaust air for each of the BEQ modules. • Each Marine Corps 2+0 Room includes a double occupancy living/sleeping area and shared bathroom include a toilet and shower compartment. Living room to include two lockable individual closets. • Maximum occupancy shall be 160 military personnel. • Living rooms should extend away from, but be within a close walking proximity to, the central core areas. • Incorporate natural lighting in living units in additional to typical floor LED lighting.	
Walls	Painted sealed precision CMU and drywall with metal furring in sleeping areas. Provide painted accent walls in sleeping rooms. Solid acrylic wall panels full height at bathroom shower walls. Provide solid surface wall panel wainscot at all walls including the toilet area. Refer to ESR C30.
Floor	Porcelain tile in bathroom and toilet. LVT flooring in sleeping area and entry.
Ceiling	Finished concrete. Drywall with metal furring. Provide perimeter ceiling soffits at both CMU unit walls for lighting and fresh air ducts. Provide a drywall soffit above the upper wall cabinets at the service area. Refer to part 6 attachments.
Furnishings	FF&E will be done by others. Construction contractor shall coordinate with the Interior Designer. Amount, type, size, and layout to be determined during the design phase. Refer to ESR E20.
Cabinetry	Provide vanity cabinets with solid surface countertop, the service area to include built-in base and upper wall cabinets, countertop and micro-fridge. Refer to ESR C30
Sink	The restroom to include under counter mounted solid surface sink with solid surface counter top. The service area to include sink at alcove to be large “bar” size stainless steel in built-in cabinetry
Windows	Provide fixed insulated, tinted glazing with aluminum painted metal frame.

Entry Vestibule/Reception/Elevator Lobby

Space Characteristics	
• Locate Entry and Reception for easy identification by persons arriving. • Exterior covered entry and/or trellis entry structures are desirable**.** Covered lighted walkways to entry point(s) of BEQ Living Unit building are items appropriate to the proposed design configuration. • Reception area shall be designed to support efficient check-in with direct visual access to the main entrance. • The entry feeling is desirable to be open well-lit with natural and artificial lighting, high volume space with storefront glazing. • Provide sun control to reduce heat build-up.	
Ceiling	Suspended continuous strip LED lighting. Recessed linear, diffusers, recessed sprinkler heads are desirable. Provide LED lights in the ceiling in accordance with FC 4-721-10N, UFC 3-530-01 & ASHRAE. Where ceiling is provided in two story spaces. Arrange Mechanical ducts, electrical conduit, fire protection pipes, etc. for controlled architectural appearance. Provide a combination of gypsum board ceiling and suspended acoustical ceiling tile at corridors to sleeping rooms. Paint underside of roof a dark color if exposed to view. Provide exposed structural system. Refer to C10 and C30 for additional requirements.
TV viewing area.	Provide a built-in media cabinet/wall system for installing a wall mounted TV in the main entrance / reception. Provide a wood veneer or other decorative wall finish, framed finish back drop with a recessed grid to receive a recessed monitor. Provide suspended cabinets approximately 8’ long for monitor components.
Recessed Entry Floor Mat	Provide fully integrated recessed grate system with a combination of metal and walk off strips.
Walls	All interior partitions including the corridors and chase walls must be sealed concrete masonry units (CMU) or cast-in-place concrete. Provide 30% at 5 score split face & 70% precision smooth face finish CMU each stacked bond in corridors, design to be finalized during design phase. Structure may include steel columns, beams, reinforced concrete decks or metal decks and combination of reinforced concrete shear walls and steel moment frames for lateral load resisting systems, masonry and concrete bearing and shear walls and non-bearing walls. The use of glass (open feel to Lobby and daylighting) must be part of the design. Refer to the ESR E20 & ESR C30. Provide corridor drywall soffits walls living room entries and corridor intersections.
Floor	Concrete floor will be a combination of highly polished and exposed aggregate finish to provide durability, ease of maintenance and create patterning. Provide recess metal strips to provide an architectural design which will minimize concrete cracking. Provide fiber additive to reinforced concrete to reduce cracking. Rubber wall base. Refer to the ESR C30.
Glazing	Provide insulator tinted glazing with U-Factor of 0.30

Furnishings	FF&E will be done by others. Construction contractor shall coordinate with the Interior Designer. Amount, type, size, and layout to be determined during the design phase. Refer to ESR E20.
Elevator lobby	Locate elevators in the Lobby area, within visual control of the reception desk. Provide accent wall finish in elevator/entry area.
Electrical	Provide accent lighting at corridor perimeter soffits to create shadows on CMU walls cast by 5 score CMU split face

Duty Office

Space Characteristics	
• The reception and administration of the BEQ will be centrally located and adjacent to the Duty office area and will accommodate two personnel. Maximize the clear view from the Duty area to the common spaces for visual control monitoring. • Design the duty office to support efficient resident check-in with direct visual access to the main entrance. • Locate the duty office adjacent to public areas to provide monitoring as much as practical. • Innovative designs are encouraged that include space relationships as required per FC 4-721-10N. Other than physical connections as described between Lounge, Laundry and Duty area, building portions may be connected or separated as needed based on site configuration and preferred building massing.	
Reception Desk	Provide architectural accent wall with backlit identifying logo/backlit letters.
Walls	Drywall
Floor	Concrete – Combination of highly polished and exposed aggregate to create patterning and interest. Rubber wall base. Refer to ESR C30.
Ceiling	Suspended acoustic ceiling tile.

Duty Bunkroom/Duty Restroom

Space Characteristics	
Provide a sleeping room for staff to support 24-hour operations. Locate adjacent the Duty Desk. Access to the Duty Bunk shall be thru the Duty Office. Bunk bed with dual-drawer storage below.	
Walls	Sealed CMU at perimeter walls Provide painted accent wall. Drywall may be used for interior partitions.
Floor	Concrete – Combination of highly polished and exposed aggregate to create patterning and interest. Rubber wall base. Refer to ESR C30.
Ceiling	Drywall with light texture perimeter soffit with lay-in acoustical ceiling.
Furnishings	FF&E to be defined during design & programming. Refer to ESR E20.
Windows	Provide fixed window for daylight.
Duty Restroom	Provide a barrier free (accessible) single-use unisex private restroom adjacent the Bunk Room and the Duty Desk. Porcelain floor tile throughout. Porcelain wall tile, full height throughout. Showers: provide full-height solid surface wall panels. Provide terrazzo shower pans. See ESR C30. Design and provide built-in cabinetry, provide under counter mounted solid surface sink with solid surface counter top. Drywall ceiling, painted with light texture. Provide continuous exhaust ventilation.
See Storage for Bedding	Provide a storage room adjacent the Duty desk.
Electrical	Provide receptacles per UFC 3-520-01 Provide lighting per UFC 3-530-01.

Public Restroom

Space Characteristics	
The Public Head must be handicapped accessible.	
Walls	Full-height porcelain tile walls. See ESR C30.
Floor	Porcelain floor tile throughout. Provide porcelain tile floor and base. See ESR C30. Provide floor drain. Align floor and wall grout joints. Provide tile grout joints 1/16” wide
Ceiling	Drywall ceiling, painted. At lavatories, provide recessed ceiling lighting trough. Provide moisture resistant drywall.
Furnishings	FF&E will be done by others. Construction contractor shall coordinate with the Interior Designer. Amount, type, size, and layout to be determined during the design phase. Refer to ESR E20.
Cabinetry	Design and provide built-in cabinetry, provide under counter mounted solid surface sink with solid surface counter top.
Mechanical	Provide continuous exhaust ventilation.
Electrical	Provide receptacles per UFC 3-520-01 Provide LED Lighting in accordance with FC 4-721-10N, UFC 3-530-01

Kitchen

Space Characteristics	
• Provide a separate residential type Kitchen adjacent to the multi-purpose room/common areas. Range with oven, cooktop and hood. • Provide seating area.	
Walls	Provide sealed 5 score split-faced 30% CMU walls and smooth finish 70%.
Floor	Polished concrete
Ceiling	Acoustic tile and grid. Provide a drywall soffit at 7′-4″ above finish floor at the upper wall cabinets.
Cabinetry	Provide built-in cabinets with solid surface countertops and full backsplashes as defined during design & programming. See ESR E20 & ESR C30.
Furnishings	FF&E will be done by others. Construction contractor shall coordinate with the Interior Designer. Amount, type, size, and layout to be determined during the design phase. Refer to ESR E20.
Mechanical	Including ducted exhaust fan
Electrical	Provide spot lighting over kitchen sink and work counter. Provide receptacles per UFC 3-520-01. Provide LED Lighting in accordance with FC 4-721-10N, UFC 3-530-01
CCTV	Provide CCTV per FC 4-730-10N requirements.
Sink	Provide double stainless steel sink, under counter mounted in built-in cabinetry with garbage disposal.

Multi-Purpose Room

Space Characteristics	
Provide a centrally located activity areas on the first floor for residents to watch television/movies, play games, relax, access the internet, etc. The room should be adjacent to laundry and Duty Office. Provide access to outside picnic spaces.	
Walls	Provide a wood veneer or other architectural accent wall finish at one wall, at a minimum. Design for a built-in media cabinet/wall system for installing a wall mounted TV on two walls at the training room areas. Design for a fixed, floor to ceiling decorative screen or partition at the training room areas to divide space from circulation. Provide acoustical sound control from adjacent circulation.
Floor	Polished concrete.
Coffered ceiling	Coffered ceiling shall have uncut tegular ceiling tiles using a 2'x2' module on a 2'x2', with perimeter drywall soffit.
Furnishings	FF&E will be done by others. Construction contractor shall coordinate with the Interior Designer. Amount, type, size, and layout to be determined during the design phase. Refer to ESR E20.
Windows	Per Designer. Consider providing adjacent exterior patio/terrace areas with windows. Provide drywall trough for solar shading system; manually operated dual-roller solar shade and room black-out shade with channels on each side and a 5% weave for light. See ESR E20.
Plumbing	Provide water coolers in interior public areas, and appropriate exterior areas.
Acoustics	Walls shall be rated minimum STC **52**. Door shall have minimum STC rating **32**.
Projection Screens	Provide built-in ceiling mounted, motorized projection screens, two each, exact locations shall be determined during Concept Design Workshop.
Audio Visual	Provide (4) CATV outlets at various locations, each adjacent (2) duplex electrical outlets. The intention is to provide convenient hookups for large wall-mounted flat panel television equipment, video game equipment, etc. Coordinate locations with the user/s and base as required. The flat screen panels shall be prewired for easy hook up to laptop computers for video presentation or video conferencing. Wireless set up is desired. Provide concealed pass-thru conduits in-wall and junction boxes and/or outlet boxes, below television flat screen panel, to accommodate cables from various video equipment. The exact design of the system and the location of conduits, outlets, and junction boxes etc. will be determined during concept design and or design development. A wireless audio video set up is desired.
Electrical	Provide receptacles per UFC 3-520-01.
Lighting	Provide LED Lighting in accordance with FC 4-721-10N, UFC 3-530-01 Provide recessed lights, and decorative accent lights, to be determined during design development. Provide multiple switching for lighting so that the room can be dimmed without using dimmer for Television watching, video game playing, and or projection for training sessions, or teleconferencing.
CCTV	Provide CCTV in accordance with FC 4-721-10N

Laundry Room (each floor)

Space Characteristics	
• Provide complete and fully operational Laundry for residents. Locate the Laundry on each floor centrally located. Laundry shall also be adjacent the Lounge for close proximity to recreation amenities. • The room shall accommodate one (1) washer and two (2) dryers for every fifteen (15) residents, as a minimum. • Stacking dryer units within a recessed wall alcove are acceptable.	
Walls	Provide durable materials such as smooth face precision CMU with epoxy finish, concrete, etc. Provide hanging rod.
Floor	Poured Epoxy. Non-slip with floor sloped to floor drain(s).
Ceiling	Drywall Ceiling, painted.
Furnishings	FF&E will be done by others. Construction contractor shall coordinate with the Interior Designer. Amount, type, size, and layout to be determined during the design phase. Refer to ESR E20.
Venting	Provide a direct exterior wall venting system for dryers, which collects lint for periodic cleanout. Roof venting is prohibited.
Maintenance	Provide space for equipment access wherever necessary for easy maintenance.
Receptacles	All general use receptacle outlets shall be GFI
Windows	Maximize glazing where possible.
Acoustics	Take measures to isolate laundry noise from other spaces. **STC 52 min**.
CCTV	Provide CCTV per FC 4-730-10N requirements. Final locations to be determined during the design phase.
Electrical	Provide recessed lighting.
Cabinetry/Casework	Provide solid surface counter for folding laundry and clothes hanging device min. All items heavy duty.
Sink	Provide min. (1) deep, fixed stainless, under counter mounted laundry sink in built-in lower cabinetry with solid surface counter top.

Vending Area

Space Characteristics	
• Provide three (3) vending machines (recess) in open areas or alcoves at central locations (elevator, lobby on each floor) convenient to residents and vendors. • Vending shall not be located in corridors or circulation spaces where thru circulation will be impeded. Locate such that vending machine servicing and restocking can be accomplished with minimal interference with building user activities. Configure area such that vending machines can be easily installed/removed with no obstruction. • Locate a vending area convenient to the multi-purpose area.	
Walls	Sealed split-faced CMU, architectural accent wall.
Floor	Concrete – Combination of highly polished and exposed aggregate to create patterning and interest. Rubber wall base.
Ceiling	Lay-in ceiling, Drywall soffit.
Electrical	Provide outlets per UFC 3-520-01 to accommodate vending equipment. If the vending area is exterior, outlets shall be weatherproof, GFCI type. Provide CCTV conduit system per FC 4-721-10N.
Mechanical	Provide adequate space for vending machines so that there is adequate ventilation behind the machine.
Vending area	Provided to accommodate the following equipment with adequate space and electrical power for Canned Soda machine snack or candy machines. Vending machines will be provided by others. All supporting infrastructure by construction contractor.

Corridor

Space Characteristics	
Circulation space from public areas to private rooms. Introduce daylight to corridors whenever possible.	
Walls	Sealed polished accent and or special finished masonry units CMU. Provide 30% split face & 70% precision smooth face finish CMU each stacked bond in corridors, design to be finalized during design phase.
Floor	Concrete – Combination of highly polished and exposed aggregate to create patterning and interest. Rubber wall base. Refer to ESR C30.
Ceiling	Lay-in acoustical 2'x2' and drywall soffits at corridor walls and at corridor intersections or wider widths to break up long corridors. Refer to ESR C30.
Electrical	Provide receptacles per UFC 3-520-01 Provide LED Lighting in accordance with FC 4-721-10N, UFC 3-530-01
Dimensions:	Minimum width 66" or unless wider dimension is required per applicable egress requirements.
Lighting	Provide recessed ceiling-mounted LED fixtures.
Electrical	Provide accent lighting at public locations where 5 score split face CMU are designed during the design phase.
Elevator	Provide two passenger/services elevators. Refer to Chapter 6, ESR D10 for elevator specifications and requirements. The elevator will primarily be used to transport furniture/equipment and occasionally for passengers with gear. Integrate the elevator efficiently into the circulation system in a central location. Interior dimensions of elevator cab shall be in compliance with ABA accessibility requirements. In general, the inside dimensions of the cab must be adequate to fit a regular size gurney place lengthwise in the elevator and not to be placed diagonal in the elevator. Elevators shall serve all building levels. Provide lock-down capability. Provide acoustic separation between elevator machine room and adjacent spaces: Walls, ceiling, floors shall have minimum STC 55. Doors shall have minimum STC 32. Elevators (one will double for deliveries). Design assembly and arrangement of elevator, accessories, and supporting systems in accordance with UFC 3-490-06 Elevators, American Society of Mechanical Engineers/American National Standards Institute (ASME/ANSI) A17.1 and NAVFAC ITG 13-01, Elevator Design Guide. Provide medium grade finish for heavy occupancy use/durability.

Bulk Storage

Space Characteristics	
Large room for bulk storage of residents' belongings	
Walls	Sealed smooth precision CMU walls.
Floor	Sealed concrete/polished
Ceiling	Acoustic tile and grid
Furnishings	FF&E will be done by others. Construction contractor shall coordinate with the Interior Designer. Amount, type, size, and layout to be determined during the design phase. Refer to ESR E20.
Mechanical	Provide continuous exhaust ventilation
Electrical	Provide receptacles per UFC 3-520-01 Provide LED Lighting in accordance with FC 4-721-10N, UFC 3-530-01

Janitor Closets

Space Characteristics	
• Provide a janitor closet adjacent the Laundry room and restrooms. • Provide metal mop rack and shelving.	
Walls	Sealed smooth face CMU with epoxy finish.
Floor	Sealed concrete.
Ceiling	Drywall Ceiling, painted.
Plumbing	Fixed janitor sink. Floor drain. Provide hot and cold water supply at janitor sink.
Electrical	Provide GFI receptacles per UFC 3-520-01& ASHRAE 90.1 Provide Lighting in accordance with FC 4-721-10N, UFC 3-530-01 & ASHRAE 90.1
Mechanical	Provide continuous exhaust ventilation

Utility Rooms

Space Characteristics	
• Provide utility rooms as necessary to house utility systems equipment. Utility equipment rooms shall be located, configured and sized in accordance with applicable codes. Rooms shall be adequately sized to accommodate all necessary equipment, allowing all required/manufacturer-recommended clearance for equipment maintenance (min. maintenance clear space shall be 36" around all equipment). • Building Orientation to sun is very important to the efficiency of the mechanical system and utility consumption over the life of this facility. • Architectural elements, materials and details will assist in achieving the sun control required, and is a critical part of this project final solution.	
Walls	Sealed smooth faced (precision) CMU, epoxy finished walls with 8" high concrete curbs. Provide sound separation and sound attenuation. Provide sound and vibration isolation for equipment installation in utilities rooms.
Floor	Sealed concrete. Provide floor drains and concrete curbs.
Ceiling	Moister resistant drywall Ceiling, painted. Provide sound separation and sound attenuation.
Electrical	Provide receptacles per UFC 3-520-01 Provide LED Lighting in accordance with FC 4-721-10N, UFC 3-530-01
Plumbing	Provide floor drain for vending areas. Provide hose bibs for general maintenance in all mechanical rooms.
Mechanical	Provide floor drains and concrete curbs, equipment pad as necessary. Slope floor toward Floor drains

6. ENGINEERING SYSTEMS REQUIREMENTS

A10 FOUNDATIONS

SYSTEM DESCRIPTION

Provide the building foundation system in accordance with Unified Facilities Criteria (UFC) 3-301-01, *Structural Engineering* and UFC 3-220-01, *Geotechnical Engineering*. Design foundations to suit subsurface conditions, capable of transmitting all building loads to the ground.

Importance Factors

Use Risk Category II in Table 2-2 of UFC 3-301-01 for determining Importance Factors for seismic and snow design.

Wind Exposure

Base wind design on Exposure C.

A10 GENERAL

GOVERNMENT PROVIDED GEOTECHNICAL INFORMATION

Subsurface soil information is included in Attachment B in Part 6 of this RFP.

The included subsurface information is only for the Contractor's information and is not guaranteed to fully represent all subsurface conditions. The Government will not be responsible for any interpretation or conclusion by the Contractor drawn from the data or information.

The included geotechnical report accompanying the subsurface information is provided only to better convey data (boring logs, testing, and other data) or to document observed site conditions. The assumptions, analysis, and recommendations of any accompanying report were developed for preliminary planning purposes only and may not reflect present project requirements. The Contractor is required to retain a Geotechnical Engineer experienced and licensed in the geographic region of the project to interpret the Government provided information as related to the design concept and develop geotechnical requirements to support design and construction.

Anticipate minor variations in subsurface conditions between borings. The Contractor is responsible for costs associated with the site preparation, ground improvement and foundations except as allowed by Contract Clause Federal Acquisition Regulation (FAR) 52.236-2, "Differing Site Conditions". The Contractor's Geotechnical Engineer must perform additional subsurface investigation/testing as required to adequately determine all applicable geotechnical factors including the type and capacity of the project foundations. The Contractor's Geotechnical Engineer is required to evaluate the provided information and any additional information obtained and prepare a report as described in other portions of this RFP. The minimum requirements for the subsurface investigation and report are as required by Facilities Criteria (FC) 1-300-09N with associated references.

Perform the soils investigation at the site for use in the design and construction of the new facilities. Perform, at Contractor's expense, subsurface exploration, investigation, testing, and analysis for the design and construction of features such as the building foundations, pavement section(s), stormwater management facility(ies), and utility structure foundations. Prepare a report including laboratory analysis of samples and recommendations for foundation and pavement design by a

Professional Engineer as specified and in accordance with UFC 3-201-01, *Civil Engineering.*

As a minimum, the successful bidder's Geotechnical Engineer must perform additional subsurface exploration and supplementary laboratory testing as necessary to support the design concept.

Observed site conditions which may present a challenge during design/construction include - The soils that will be exposed after completion of stripping will be soft and at or near the groundwater elevation. Anticipate these marginal subgrade support conditions and incorporate measures into the design and construction procedures to obtain required soil support while maintaining progress for completion on schedule.

Provide personnel under the supervision of a registered Professional Engineer to inspect excavations and soil/groundwater conditions throughout construction. The Engineer is required to perform pre-construction and periodic site visits throughout construction to assess site conditions. The Engineer, with the concurrence of the Contractor and the Contracting Officer, is required to update the excavation, sheeting, shoring and dewatering plans as construction progresses to reflect actual site conditions and is required to submit the updated plan and a written report (with professional stamp) at least monthly informing the Contractor and Contracting Officer of the status of the plan and an accounting of Contractor adherence to the plan; specifically addressing any present or potential problems. The Engineer must be available to meet with the Contracting Officer at any time throughout the Contract duration. Provide the services of the Engineer at no additional cost to the Government. It is important to note that the presence of loose or compressible soils may result in excessive settlement that could impact the performance of surface bearing structures and supporting facilities such as foundations, slabs, pavements, sidewalks, and utilities. The magnitude and duration of consolidation settlement will be dependent on the composition, depth, and thickness of the compressible soils as well as the successful bidder's design concept. The Contractor's Geotechnical Engineer is responsible for evaluating potential global settlement due to designed grade increases and final structural loads. The Contractor's Geotechnical Engineer must develop any settlement mitigation procedures (such as preloading, surcharging, fill monitoring programs, and ground improvement systems) needed to maintain global settlements within tolerable limits. Surcharge material, if required, must remain in place for a minimum of 90 days.

SEISMIC DESIGN

Determine the Seismic Site Classification in accordance with UFC 3-301-01, *Structural Engineering*.

A1010 STANDARD FOUNDATIONS

As determined by the Designer of Record to be applicable, provide a Standard foundation. "Standard Foundations" are shallow or deep foundations as specifically addressed in International Building Code (IBC) Chapter 18. Do not use masonry unit footings, steel grillage footings, timber footings or wood foundations. Treated timber piles may be used if determined acceptable by the Designer of Record. Test.

A1020 SPECIAL FOUNDATIONS

As determined by the Designer of Record to be applicable, provide a Special foundation. "Special Foundations" are any foundations that are not specifically "Standard Foundations", or a combination of Standard Foundations and a site improvement/ground modification system. Examples of site improvement/ground modification systems include surcharging, stone columns, rammed aggregate piers, impact densification, compaction grouting, vibroflotation, and other similar systems. As "Special Foundation" techniques or systems typically require the use of specialty contractors, a Professional Engineer must establish installation and acceptance criteria and supervise the installation. The Designer of Record must submit justification for use, including acceptable evidence of previous successful installation in similar conditions, methods and equipment used in their

installation, proposed testing and inspection to be used, supporting test data, calculations and any other information related to the structural properties and load capacity of such system. The allowable stresses for piles/piers must not exceed those limitations specified in UFC 1-200-01

A1030 GROUND FLOOR SLABS

As determined by the Designer of Record, provide soil supported concrete slab on ground. Where slab on ground is below the existing adjacent exterior grade, provide water/dampproofing and a perimeter drainage system to remove ground water from the area immediately adjacent to the buildings. Provide perimeter and under slab insulation in accordance with UFC 3-101-01, *Architecture*.

As determined by the Designer of Record to be applicable, provide a structurally supported slab. Provide for support of all utilities that may be adversely affected by soil consolidation or expansive soils. Provide stainless steel supports sized adequately to support the in-service utility. Where the structurally supported slab is below the existing adjacent exterior grade, provide water/dampproofing and a perimeter drainage system to remove ground water from the area immediately adjacent to the buildings. Provide perimeter and under slab insulation in accordance with UFC 3-101-01, *Architecture*.

A1040 STRUCTURALLY SUPPORTED SLAB

As determined by the Designer of Record to be applicable, provide a structurally supported slab. Provide for support of all utilities that may be adversely affected by soil consolidation or expansive soils. Provide stainless steel supports sized adequately to support the in-service utility. Where the structurally supported slab is below the existing adjacent exterior grade, provide water/dampproofing and a perimeter drainage system to remove ground water from the area immediately adjacent to the buildings. Provide under slab insulation in accordance with ASHRAE 189.1, Normative Appendix A.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

B10 SUPERSTRUCTURE

SYSTEM DESCRIPTION

Provide the building framing system in accordance with UFC 3-301-01, *Structural Engineering*. Precast concrete tilt-up construction is not allowed.

Importance Factors

Use Risk Category II in Table 2-2 of UFC 3-301-01, *Structural Engineering* for determining Importance Factors for seismic, snow, and wind design.

Wind Exposure

Base the wind design on Exposure C.

Seismic Design Category

The Seismic Design Category is D.

B1010 FLOOR CONSTRUCTION

The floor construction may include non-composite concrete slabs on form deck on steel joists, non-composite concrete slabs on form deck on steel beams, composite concrete slabs on composite steel deck, cast-in-place concrete slabs on removable forms, or precast concrete slabs.

B1020 ROOF CONSTRUCTION

The roof construction may include steel roof deck on steel joists, steel roof deck on steel beams, non-composite concrete slabs on form deck on steel joists, non-composite concrete slabs on form deck on steel beams, composite concrete slabs on composite steel deck, cast-in-place concrete slabs on removable forms, or precast concrete slabs.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

B20 EXTERIOR ENCLOSURE

SYSTEM DESCRIPTION

This system consists of the exterior shell of the facility, which includes all vertical and horizontal exterior closure such as exterior walls, exterior windows, and exterior doors. This system excludes roofing (See System B30, *Roofing*). Include load bearing exterior walls here, and not in System B10, *Superstructure*. Structural frame elements at exterior such as columns, beams, and spandrels are included in Superstructure, with only the applied exterior finishes (e.g., paint, stucco) being included here. Finishes to the inside face of walls which are not an integral part of the wall construction will be included in System C30, *Interior finishes*.

Applied exterior finishes (i.e. paint, etc.) are part of this section. Finishes to be inside face of walls, which are not an integral part of the wall construction, will be included in System C30, Interior Finishes

In general use factory applied finishes whenever possible. Minimize field applied finishes to improve air quality, and to obtain better quality control for finishes.

Refer to UFC 3-100-10N, Architecture, and UFC 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings* for additional requirements. FC 4-721-120N *Navy and Marine Corps Unaccompanied Housing*, and any other applicable building codes.

GENERAL SYSTEMS REQUIREMENTS

B2010 EXTERIOR WALLS

Provide a ventilated, rain-screen, exterior wall system composed of the Exterior Closure.

Provide a design using clear matte spilt-faced, smooth finish and polished CMU as determined by the final design. An enhanced finish block is desired.

Provide architectural grade for appearance clear matte sealed concrete shear walls with concrete chamfers/ties and formwork.

Provide tinted, low “e”, insulated glazing at the Lobby, Multi-purpose areas and Living rooms.

B201001 EXTERIOR CLOSURE

Provide Exterior Closure system as described below.

Provide predominantly integral-colored split-faced concrete masonry units as the Exterior Closure. Exact palette shall be finalized during the Design Phase of the Design/Build SOW.

Provide, for appearance, architectural grade concrete shear walls with exposed concrete ties and a chamfer grid. Formwork shall be smooth, no wood grains and staining are acceptable.

The exterior concrete masonry shall have in each sleeping unit, one window, approximately 4’x6’ in size with an insulated low “e” fixed panel above an operable pivot section below.

Wall assemblies shall be provided with prescribed minimum Sound Transmission Class (STC) rating of 55 in accordance with ASTM E 90 and Impact Insulation Class (IIC) rating of 60 in accordance with ASTM E 492.

Stucco, EIFS, wood siding, vinyl siding, prefinished insulated metal panels, manufactured face panels or masonry units other than listed above, shall not be used.

B201003 INSULATION & VAPOR RETARDER

Provide continuous insulation, vapor retarder, water-resistive barrier, and air barrier to meet or exceed requirements of project's energy savings requirements as indicated by applicable American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) 90.1 calculations called for in Unified Facilities Criteria (UFC) 1-200-02, *High Performance and Sustainable Building Requirements*, and meeting minimum building envelope insulation requirements of UFC 3-101-01, *Architecture*.

Provide a continuous air barrier to control air leakage into, and out of conditioned spaces. The air barrier must encompass all elements of the facility that are exposed to the outside environment or outside environmental conditions such as roof, walls, floors, and compartmentalized unconditioned portions of the facility such as garages, and negatively pressurized spaces. Permanently seal penetrations through the air barrier, joints in the air barrier, adjoining construction, and transitions to different air barrier materials.

Confirm air barrier compliance with Air Barrier Performance Test in RFP Part 4 B20, *Exterior Enclosure*.

Provide thermal envelope performance testing through infrared thermography in accordance with RFP Part 4. Coordinate thermal imaging testing with air barrier testing construction schedule.

Provide a continuous water resistive barrier in accordance with UFC 3-101-01, *Architecture*. The water resistive barrier must resist liquid (bulk) water from being absorbed into the back-up wall assembly if water leaks, penetrates, or seeps past the exterior enclosure cladding system.

Provide a vapor pressure analysis and hygrothermal analysis in accordance with UFC 3-101-01, *Architecture.* Determine if a moisture barrier/ vapor retarder is required and where it would be located. Include analysis and conclusion in the design analysis for the project, refer to Part 2 Section 01 33 10.05 20*, Design Submittal Procedures*. If required by the analysis, provide a moisture barrier/ vapor retarder to restrict the flow of moisture through the exterior enclosure.

Include written and graphic descriptions of exterior enclosure barrier materials and location within the wall as a part of the Contractor provided design analysis. Identify in the analysis the continuous boundary limits of the air barrier and of the zone or zones to be field tested for building air tightness.

Provide contract drawings that indicate each exterior enclosure barrier location and the materials that make up the barriers. Detail the following barrier conditions;

1. Typical conditions at wall sections.

2. Barrier treatment at wall openings.

3. Intersections with other exterior enclosure assemblies and materials. Include intersections at roof and floors.

4. Intersections with counter flashing.

5. Inside and outside corners.

6. Preservation of air and water tightness at anchors for materials that cover the barrier.

7. Treatment to seal barrier penetrations such as conduits, pipes, electric boxes, and fixtures.

8. Indicate air barrier perimeter, if facility is segmented into areas that are not within the air barrier envelope.

B201005 EXTERIOR LOUVERS & SCREENS

Provide exterior louvers and screens, where required, that match the finish of the existing windows and detailed to integrate with the architecture of the building, as appropriate to the design of the building.

B201006 BALCONY WALLS & HANDRAILS (not at Living rooms)

Provide balcony walls compatible with the exterior architecture of the building. Provide non-corrosive metal railing systems including anchors and attachment sleeves and fasteners. Exterior railings and guard rails shall have an architectural perforated metal or wire mesh screen panel. At the ground level of the exterior stairs, provide a cage enclosure to restrict re-entry using the same metal fabrication as used at the railings.

No balconies are anticipated on Living rooms.

B201007 EXTERIOR SOFFITS

Provide pre-finished non-corrosive metal exterior soffit systems. Overhangs with finished soffits shall be incorporated into all sloped roofs.

B201009 EXTERIOR PAINTING AND COATINGS

Provide field applied exterior coatings for all items that are not prefinished, and to prefinished items when required to provide a color other than a standard prefinished color.

B201010 EXTERIOR JOINT SEALANTS

Provide exterior application of joint sealants to seal joints and prepare for finish material installation.

B201011 SUN CONTROL DEVICES (EXTERIOR)

Provide fixed horizontal type. Detail sun control devices to integrate with the architectural wall system.

B201012 SCREEN WALL

Provide screen walls to screen mechanical units, electrical substations, loading docks, and trash receptacles. Provide screen walls compatible with the exterior architecture of the building. Design rooftop mechanical screens to minimize roofing penetrations.

B2020 EXTERIOR WINDOWS

Provide windows in each area of the building that is regularly occupied, to enhance the working environment, without compromising visual acuity and comfort. Natural daylighting is preferred. Exterior windows must be prefinished aluminum. Windows must meet Antiterrorism requirements.

Screen wall material may include, but not limited to, masonry, metal and tubular metal components.

If approved by the DOR, the sample window may be installed in an opening in a framed wall, and the mock-up may be left during construction as a cut-away of the installation. For masonry walls, install the sample window in the masonry sample panel.

B202001 WINDOWS

Determine the construction of security windows by evaluating the project program security requirements, using the Military Handbook (MIL-HDBK) 1013/1A, *Design Guidance for Physical Security of Facilities*, to define window requirements.

Provide operable aluminum windows.

Provide integral insect screens for all operable windows.

Provide a mockup of one combination window unit for the project to be used for a field mockup test of compliance with American Architectural Manufacturers Association (AAMA) 502 Method A and Method B.

B202002 STOREFRONTS

Storefronts must be anodized aluminum frame with insulated, tinted, low “e” tempered glazing, as required by code.

B202003 CURTAIN WALLS

A curtain wall is a reinforced window wall that spans more than one story in height.

Consider a multi-story glazed curtain wall system at high locations like the main entry area.

Provide a standard architectural type Unit and Mullion system, with mullions, horizontal rails, and/or non-integral spandrel panels. Fully coordinate system accessories directly incorporated and adjacent to contiguous related work and insure materials compatibility, deflection limitations, thermal movements, and clearances and tolerances.

Provide a system that is a combination of glazed panels and opaque panels. For design purposes, base provisions for thermal movement on assumed ambient temperature range of from 48 degrees F to 100 degrees F .

B202004 EXTERIOR GLAZING

Provide glazing with a color compatible with the final selected materials.

Provide tinted heat absorbing glass, wire glass and insulating tempered glass, patterned tempered glass, and spandrel glass with adhered backing type glazing, as required by the final design.

B2030 EXTERIOR DOORS

Provide solid door assemblies other than at the main entrance. Exterior doors and frames must be non-corroding factory-primed.

Provide Maximum Duty Doors -– American National Standards Institute/Steel Door Institute (ANSI/SDI) A250.8, Level 4, physical performance Level A, Model 1 or 2.

Provide glazing that matches the window glazing.

Provide heavy duty exterior doors for maintenance and replacement of all major plumbing, mechanical, electrical, tele-communication and fire protection equipment.

Provide exterior doors compliant with ASHRAE Standard 90.1 requirements and for doors between a conditioned and unconditioned space including but not limited to, the maximum U-value for a door assembly as well as air leakage requirements and desert climate issues.

B203001 SOLID DOORS

Provide solid heavy duty solid hallow steel frames and insulated doors, other than at main entrance including factory-primed maximum-duty, non-corroding, insulated doors with frames and hardware. Also provide louvers and accessories and wall opening elements such as lintels, sills and flashings.

B203002 GLAZED DOORS

Glazed Doors - Provide Exterior Glazed Doors and Entrances System. including factory-finish aluminum framed door assemblies with insulated, tinted glazing, frames, and hardware compatible with other adjacent buildings and wall opening elements such as lintels, sills, through-wall flashings, and joint sealers to match anodized aluminum mullion material and/or color.

B203008 EXTERIOR DOOR HARDWARE

Provide the services of a certified door hardware consultant to prepare the door hardware schedule.

Provide hardware keying compatible with the existing base-wide keying system. Provide replacement interchangeable cores compatible with the Best Lock system.

Provide a card key system for sleeping room entry doors, secondary/service/maintenance entry doors, and ground level stairwell egress doors.

Provide heavy duty stainless steel door hardware finish on all components and thresholds.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

B30 ROOFING

B30 GENERAL SYSTEM DESCRIPTION

Provide watertight roof systems compatible with facility function, construction, and service conditions. Provide complete roof system design and construction services for the entire new facility roof system, including all ancillary and incidental work necessary for a complete, new, watertight roof system installation.

Submittal Requirements: Components of a minimum roof submittal include the roof plan, method of drainage, standard details and details unique to the project, wind load calculations and requirements.

Provide a Pre-Design Roofing Conference (if required in RFP Part 4) and Pre-Roofing Conference to assure roof design and construction is properly coordinated before construction begins.

Built-in gutter systems where drainage passes through an interior space or is concealed in the exterior cavity wall shall be prohibited.

Refer to Unified Facilities Criteria (UFC) 3-110-03, *Roofing*, UFC 3-101-01, *Architecture*, and UFC 1-200-02 *High Performance and Sustainable Building Requirements* for additional roofing requirements.

B3010 ROOF COVERINGS

B301001 STEEP SLOPE ROOFING SYSTEMS

Steep slope roofing systems are required. Steep slope roofing systems that are acceptable include standing seam metal only.

The roof system shall be designed and attached to resist wind uplift pressures calculated in accordance with ASCE 7. Uplift resistance shall be validated by applicable Factory Mutual (FM), Underwriters Laboratories (UL) or ASTM uplift resistance test procedures. Steel panels shall be zinc-coated steel conforming to ASTM A 653/A 653M, G90 coating; aluminum-zinc alloy coated steel conforming to ASTM A 792/A 792M, AZ 55 coating; or aluminum-coated steel.

Specular Gloss of Finished roof surfaces shall have a specular gloss value of 30 plus or minus at 60 degrees when measured in accordance with ASTM D 523.

B301002 LOW SLOPE ROOFING SYSTEMS

Low slope roof is only allowed where mechanical equipment will be installed.

When low-slope roofing systems are used, a PVC single ply system shall be provided. Seams must be heat welded together. Install must be certified.

B301003 ROOF INSULATION AND FILL

Provide roof insulation values no less than in accordance with UFC 1-200-02, *High Performance and Sustainable Building Requirements* and UFC 3-110-03, *Roofing*.

Increase roof and exterior wall insulation U-values by 10% above assembly of U-value material assembly required in ASHRAE 189.1, Zone 2B.

For fastening roof insulation on low-slope membrane roofs, place fasteners to withstand and obtain an uplift pressure of 120 pounds per square foot with a safety factor of 2.15kPa in the field of the roof and FM Loss Prevention Data Sheets (LPDS) 1-49 for perimeter component and flashing attachment.

B301004 FLASHINGS AND TRIM

Flashing and sheet metal work includes scuppers, splash pans, and sheet metal roofing. Flashings must be Steel Sheet, Zinc-Coated (Galvanized) - ASTM A 653/ A 653M. Galvanized steel items must have a baked-on, factory applied finish of polyvinylidene fluoride or an equivalent fluorocarbon coating. Refer to Stainless Steel - ASTM A 167, Type 302 or 304.

B301005 GUTTERS AND DOWNSPOUTS

Provide gutters and downspouts compatible with roofing material and finish. Concealed (interior) gutters and downspouts are prohibited.

B301006 ROOF OPENINGS AND SUPPORTS

Provide roof hatches for access to rooftop-mounted mechanical equipment if applicable at all low slope roofs. Provide pull down access ladder to the roof opening. Provide guardrails at roof edges where rooftop-mounted mechanical equipment lies within 10 feet of edge of roof. Provide premanufactured equipment curbs and supports for various items and equipment mounted to the roof.

Use only products approved by the roofing system manufacturer; and include such items in the roof warranty for each facility.

B301090 OTHER ROOFING

Provide lightning protection, without penetrating the roof membrane or flashing components.

Provide new roof drains and accessories.

Provide Screens for all roof-mounted equipment, engineered and reinforced to resist all applicable vertical and wind loads. In addition, all roof mounted supports for the screening materials, and roof mounted equipment installation must meet the requirements of fire code, and must meet the warranty provided the roofing manufacturers. Materials, color and finish of support structures and screens must be compatible with the roofing material, color and finish.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

C10 INTERIOR CONSTRUCTION

SYSTEM DESCRIPTION

Interior construction includes interior partitions, interior doors, and fittings.

Provide durable construction appropriate for the building's function as a Marine Corps barracks. Acoustic properties of materials, as well as durability, must be considered during material selection.

GENERAL SYSTEM REQUIREMENTS

The Project is subject to abuse and requires an "Impact Resistant" systems be provided. See "Room Requirements" for specific requirements on "Partitions", "Interior Doors", and "Specialties".

C1010 PARTITIONS

All interior partitions at the perimeter of the Living rooms, including the corridors and chase walls must be concrete masonry or cast-in-place concrete.

Concrete mixture must provide an average compressive strength of 3000 PSI (20,680 kPa) and meet or exceed American Concrete Institute (ACI) 301/301M.

C101001 FIXED PARTITIONS

Provide fixed interior partitions that extend from finished floor to underside of structure above. Sound-rated partition assemblies around perimeter walls of each sleeping room shall have a minimum Sound Transmission Coefficient (STC) of 55 in accordance with American Society for Testing and Materials (ASTM) E 90 or ASTM E 413 for frequency data. Contractor shall follow the STC requirements on FC 4-721-10N.

C101005 INTERIOR WINDOWS

Provide interior windows of aluminum hollow metal, fixed or operable depending on the individual use. Provide each window as a complete factory-assembled unit with glass factory or field installed.

C101006 GLAZED PARTITIONS & STOREFRONTS

Provide insulated, tinted, low “e” glazed storefront system. Refer to B20 Exterior Enclosures for additional information.

C101007 INTERIOR GLAZING

Provide interior glazing of clear glass, tempered glass.

C1020 INTERIOR DOORS

C102001 INTERIOR DOORS

All interior doors and frames must be hollow metal.

All interior doors must be flush type doors and must be insulated metal or solid core wood as identified in the Room Requirements Charts.

Flush wood doors must be WDMA I.S.1A-04, custom grade, extra heavy duty.

Flush Steel doors must be heavy duty, Level 4, physical performance Level A.

Doors must have Factory Finish of Architectural Woodwork Institute (AWI) Quality Standards Section 1500, specification for Conversion varnish alkyd urea, catalyzed polyurethane or acrylated uv curable epoxy.

Provide 55 STC sound rated door and standard hollow metal door frame with continuous sound/ weather seals around the door to create a sound control door. Provide sound/ weather seals at the top and both sides that are integral with the door frame and drop down door bottom sound/ weather seals must rest on a metal threshold. After installation, test the doors with a flashlight to determine if any gaps in the sound seals allow light to be viewed on the opposite side of the door.

C102002 GLAZED INTERIOR DOORS

Provide vision glazing in doors as deemed advantageous to be able to see through the door, either for safety of pedestrian traffic, or other functional reason.

C102003 FIRE DOORS

Provide interior fire doors as necessary to meet applicable codes.

C102007 INTERIOR DOOR HARDWARE

Provide card key type access units for Room Plan entry doors and building main entry doors. Provide lithium battery powered, magnetic stripe keycard locksets that are American National Standards Institute/Builders Hardware Manufacturers Association (ANSI/BHMA) A156.2, Series 4000, Grade 1, cylindrical locks, tamper resistant, Underwriters Laboratories (UL) listed with 1 inch (25 mm) throw deadbolt, 3/4-inch (19 mm) throw latch bolt, auxiliary dead-locking latch, and 2-3/4 inch (68.75 mm) backset.

Provide lock cores compatible with the BEST system.

Provide stainless steel door hardware finish.

C1030 SPECIALTIES

C103002 TOILET AND BATH ACCESSORIES

Provide toilet and bath accessories as indicated in FC 4-721-10N.

Provide toilet and bath accessories as required to have a complete and usable facility for the project. Provide toilets and bath accessories from one manufacturer for the project. Accessories shall be of current production model and make. Obsolete and items that are no longer in production shall not be used on the project. All accessories shall be installed with reinforced backing using tamper proof fasteners.

C103003 MARKER BOARDS AND TACK BOARDS

Provide marker boards and tack boards in the Duty Office and Multi-Purpose Room. Marker boards and tack boards are funded as part of the construction contract. Additionally, provide one each tack board in public corridors near each entry to the BEQ. Install tack board in such a way that it will be tamper proof.

C103004 IDENTIFYING DEVICES

Provide signage in accordance with FC 4-721-10N, paragraph 3-6.11 and 3-7.11. Provide interior room identification signs on each entrance to each interior room. Provide signage to identify each space by room number and name. Signage for general office areas must have changeable room name sections to accommodate personnel and functional changes.

Incorporate all necessary interior signage as part of the architectural drawings. Interior signage is not collateral equipment. Interior signage must demonstrate complete coordination with the facility design, Structural Interior Design (SID) and FF&E submittals. Provide interior directional signage as required for facility wayfinding. Provide an identifying device at each interior door. Signs must meet Architectural Barriers Act (ABA) Standards requirements. Refer to Unified Facilities (UFC) 3-120-01, Design: Sign Standards, for more information.

C103005 LOCKERS

Provide high density polyethylene/solid plastic with special bases as required by the required function. At minimum provide half-sized lockers for each employee. Lockers are funded as part of the construction contract.

C103006 SHELVING

Provide heavy-duty wire shelving. Built-in fixed shelving is funded as part of the construction contract.

Sleeping Unit Closets will be designed, after an assessment of the occupants' storage requirements, to provide the most efficient use of the storage area available.

C103007 FIRE EXTINGUISHER CABINETS

Provide fire extinguisher cabinets. Cabinet must be semi-recessed in new construction and surface-mounted in new mechanical/electrical spaces and existing wall construction. Coordinate cabinets with interior finishes.

C103008 COUNTERS

Provide solid-surface counter tops and back splashes within a Grade 3 level with a full range of color selection.

C103009 CABINETS

Provide cabinetry and millwork items with associated accessories. Cabinetry must be Architectural Woodwork Institute (AWI) custom grade and have concealed hinges with adjustable standards for shelves. All exposed surfaces must be hardwood veneer with exposed edges of solid hardwood.

Cabinetry doors and drawer fronts must be solid hardwood.

C103012 FIRESTOPPING PENETRATIONS

Provide all sleeves, caulking, and flashing for firestopping penetrations.

C103013 SPRAYED FIRE-RESISTIVE MATERIALS

If structural steel framing is used provide sprayed fire-resistive materials to the building's structural framing components as required by Building Code to prevent structural failure.

C103014 ENTRANCE FLOOR GRILLES AND MATS

Provide recessed pan floor mats at main building entrances.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

C20 STAIRS

SYSTEM DESCRIPTION

Provide stairs, including stair construction and stair finishes as required by the building code to provide egress from the building from above or below grade level floors. Stairs must be in accordance with Unified Facility Criteria (UFC) 1-200-01, *DoD Building Code (General Building Requirements)*.

Stairs, including stair design, locations, construction materials and stair finishes, shall be provided as required by the applicable building codes, including the International Building Code, ABA and Life Safety codes.

Stair tread and stair landing design and construction shall be so that noise will be minimize by reducing vibration, echoing when used by heavy foot traffic. Separation joints and or assembly tolerance between stringers and adjacent walls, and between landing and adjacent walls shall be closed, caulked as required to prevent trashes and other unwanted items falling through the cracks.

In general, stair may be constructed of cast in place concrete or pre-cast concrete construction. Stair treads and intermediate stair landing may be precast, or concrete fill metal pans of sufficient rigidity and strength and sound attenuation capacity. Treads and landing when prefabricated using concrete fill in metal pans may be connected to metal stringers of sufficient strength and rigidity so that no vibration can resonate when used by multiple troops in combat boots. STC 55 and IIC 60 between stairwells and adjacent rooms and spaces are required.

In addition, stair construction must comply with fire resistive construction requirements and Life Safety code requirement. No crack or voids are allowed between Precast, prefabricated stringers, risers, intermediate landing and adjacent construction to avoid collection of debris and trashes in these cracks and voids.

If exterior stairs are provided, a wall to shield personnel and stairs from direct sunlight is required. Design to protect stairs from sun, but in a way to minimum impact allowable square footage. Provide cage gate, etc. for exiting control. Stair enclosure material must be coordinated with building material selection. Provide required hardware as required by exiting/building control requirements.

GENERAL SYSTEMS REQUIREMENTS

C2010 STAIR CONSTRUCTION

C201001 INTERIOR AND EXTERIOR STAIRS

Stairs shall be architecturally incorporated into the overall building design and shall be functionally and visually treated as creative design elements.

Winding, circular or spiral stairs are prohibited.

Provide landings which are the full width of the stairwell without intermediate risers.

Provide interior stairs constructed of steel with concrete filled pans or cast-in-place concrete, replaceable slip-resistant nosings.

Provide exterior stairs constructed of cast-in-place reinforced concrete, replaceable slip-resistant nosings.

Concrete is an acceptable finish for exterior stairs. Provide cast aluminum treads with abrasive surface for all exterior concrete stairs.

Steel stairs must be primed and painted.

C201090 HANDRAILS, GUARDRAILS, AND ACCESSORIES

Provide painted steel handrails and guardrails. Handrails and guardrails must present a smooth, unbroken surface throughout the length of the stair.

Handrails and guardrails must be finished to withstand extreme wear conditions.

Metal ladders and railings complying with Occupational Safety and Health Administration (OSHA) requirements must be provided for access and protection to any mechanical mezzanines, lofts or other similar spaces.

Guard rails and railings at all exterior stairs shall have an architectural perforated metal or wire mesh screen panel. Refer to B201006 for additional information.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

C30 INTERIOR FINISHES

SYSTEM DESCRIPTION

Interior finishes include wall finishes, floor finishes, wall base finishes, and ceiling finishes.

Provide aesthetically pleasing, functional, durable finishes appropriate to the buildings function. Consider acoustic properties of materials, as well as durability and ease of maintenance during material selection. Maximize the use of sustainable materials.

All interior finish products shall be from manufacturers' standard running line offerings. Custom fabrications shall not be allowed unless otherwise noted.

Color selections require the use of wall and floor finish material accents to enhance the color and appearance of the interior design.

GENERAL SYSTEMS REQUIREMENTS

See Part 3 Chapter 5 "Room Requirements" for specific requirements on interior finishes.

The contractor must have an NCIDQ certified Interior designer prepare the SID.

Upholstered Furniture, fabrics (acoustical panels, baffles, wallcovering, etc.), carpets and rugs that have been treated with stain-resistant coatings that are specified and procured by the Contractor must be PFOS (Perfluorooctane Sulfonate) and PFOA (Perfluorooctanoic Acid) free. The Contractor must ensure that proposals meet this requirement and will provide documentation to the government, upon request.

Spaces are not limited to those indicated in the Part 3 Chapter 5 "Room Requirements." Spaces must be designed during client programming.

Provide a wall color design that includes a minimum of (3) different accents colors throughout the facility. Provide a floor color design that includes a minimum of (3) different accent colors throughout the facility. Submit pattern drawings of the accents design with the interior design submittal.

All wall/floor finishes must be comprised of a field and accents as stated above. Finish selections must not be limited by pricing grade, color, finish or size.

All painted surfaces must receive a finish consistent with use.

C30 SSPC QP 1 CERTIFICATION

Provide industrial coatings on surfaces as required.

All Contractors and subcontractors that perform surface preparation or coating application must be certified by the Society for Protective Coatings (formerly Steel Structures Painting Council - SSPC) to the requirements of SSPC QP 1 prior to contract award, and must remain certified while accomplishing any surface preparation or coating application.

C3010 WALL FINISHES

Interior wall finishes are also indicated in the “Room Requirements” portion of this RFP. Materials and finishes are not all inclusive. Refer to the “General Systems Requirements” for additional information.

Provide wall finish materials to meet the following requirements;

a. Paint Requirements

Gypsum walls shall receive latex primer and two coats of Architectural Latex in a satin or eggshell finish. See C3040 INTERIOR COATINGS AND SPECIAL FINISHES.

Paint sheen schedule as follows:

Flat:	Ceilings (all locations except Toilet Rooms)
Eggshell:	Walls (all locations except Toilet Rooms)
Semi-Gloss:	Toilet Rooms (Walls and ceiling); Painted Doors and Painted Door Frames
Epoxy:	Railings, utility rooms, Janitor’s closet
Flat:	Structural Steel

Provide minimum (1) accent painted wall in all offices, main entrance, reception/duty, training room and laundry.

Provide two (2) accent painted walls & ceiling soffits in all living rooms. Provide a minimum of (3) accent paint colors in corridors.

Provide heavy duty stainless steel corner guards in all high traffic corridors as required. Corner guards to be a minimum of 2” wide and run full height of wall.

b. Porcelain Tile Requirements

Provide through body, minimum 6” x 12”, 6” x 18”, 12” x 24”, 12” x 36” porcelain tile, and minimum (price) Grade B tiles with a wide range of accent colors available.

Provide designer decorative accent strips or coordinating accessory tile shapes or similar design feature, minimum (price) Grade D, as an integral part of the porcelain wall tile system.

Provide grouted in stainless steel edge protection strips at all outside corners.

At newly tiled walls, where porcelain tile bullnose does not exist, install stainless steel square edge finishing and edge protection at outside corners of tiled surfaces. New stainless steel edge must be flush with tile face, and anchoring legs must be secured in the mortar bond coat beneath the tile.

Toilet Room(s) Public: In the public restroom areas, provide full height porcelain tile at all walls at all toilet rooms. Restroom wall tile to have 40% decorative accent tiles and patterning. Provide accent tile, full height and width behind the mirrors at sink/s. Decorative tile to be various sizes and/or finish.

Toilet Room(s) Living Rooms: In the living room restrooms, provide solid acrylic wall panel wainscot, 48” high at all walls including toilet area, with the exception behind the mirrors. Provide accent porcelain tile, full height and width behind the mirror at sink/s. Decorative porcelain tile to be various sizes and/or finish. Install stainless steel square edge finishing and edge protection at top of wainscot.

Provide porcelain tile with accent patterning on all 3 walls of water fountain alcoves.

Provide epoxy grout at all wall tile finishes. Provide thin grout joints lines at all tile locations. Wall and floor tile grout joints must align.

Casework Sink or Cooktop: Provide glazed ceramic tile backsplash at kitchen/break rooms. Wall tile

must extend from top of kitchen countertop to underside of upper wall cabinet. Tile shall extend width of sink/cook top cabinetry and should match/compliment countertops. Coordinate with millwork.

c. Solid Acrylic Wall Requirements

Casework Sink or Cooktop: Provide solid acrylic wall finish backsplash at cabinetry/alcove in all living rooms. Wall finish must extend from top of countertops to underside of upper wall cabinets. 1/4" solid surfacing wall panel shall extend width of sink/cabinetry and wrap to adjacent side walls. Solid surface wall panel should match countertops. Coordinate with millwork.

Showers: 1/4" thick solid acrylic material must overlap top of shower pan with an air gap, as required, and extend to ceiling. Locate wall panel seams at corners only. No material seams will be acceptable, except at corners. All shower seams at corners must be lap joints with solid acrylic corner trim from floor to ceiling. Epoxy seams to match solid surfacing material. Include a matching corner shower shelf in each shower compartment. Full height solid acrylic transitions must be provided at adjacent wall surfaces. Substrate behind solid acrylic shower walls must be equal to cementitious ceramic tile backer board. Terrazzo shower receptors must be installed prior to wall system. Receptors must be a minimum thickness of 1/2" thick, with a 3/4" thick area at least 12" in diameter at the drain. Receptors must be one-piece, factory formed shower pans with integral thresholds. Thresholds must have structural supports every 4" on center. Solid acrylic surround must extend far enough beyond the shower stall to include the installation of the shower rod.

Where applicable, solid acrylic wall finishes must extend from top of shower pan to ceiling and must surround the shower enclosure. The shower pan must be terrazzo.

Wall panels in showers and tubs must extend horizontally beyond the "wet area", to the exterior line of the shower receptor threshold.

Provide solid acrylic wall panel wainscot, 48" high on walls in the living room restrooms. See Porcelain Tile Requirements, b. above.

A solid acrylic transition is required where solid acrylic meets wall tile.

d. Wall Protection Requirements

Provide heavy duty stainless steel corner guards in all high traffic corridors as required. Corner guards to be a minimum of 2" wide and run full height of wall.

Unless noted otherwise, wall protection components should not change color per location. All corner guard colors should be consistent.

e. Miscellaneous

Provide acoustical wall treatment such as but not limited to fabric wrapped panels adhered to the walls in a variety of colors, shapes or graphics, or full height acoustical felt adhered to the walls, layered with cut out designs or graphics in the multi-purpose room/training room areas.

Built-in Lockers: Must be high density polyethylene/solid plastic. Lockers are not collateral equipment.

Toilet Partitions: Must be high density polyethylene/solid plastic.

C3020 FLOOR FINISHES

Floor thresholds must be located from the inside of the door jamb to the inside of the door strike.

All floor material transitions at doorways must be located at closed door center.

All finished floors shall meet or exceed NAVFAC COF/DCOF minimum requirements for slip resistance.

Provide floor finish materials to meet the following requirements:

a. Concrete Floor Requirements

Finish concrete surface smooth enough to meet the minimum requirements of this RFP or the floor finish manufacturer's smoothness requirements, whichever is the most restrictive.

Provide (3) coats of the manufacturer's approved sealer for exposed concrete floors that are not required to have an applied floor finish.

Provide a level 4 polished concrete floor. 50% polished and 50% exposed multi-colored, multi-size aggregate. Provide multi colored aggregate topping with integral color pigment to create patterning. Include recessed flush metal strips for design, patterning and eliminate cracking.

Provide an on-site concrete flooring mock-up(s) for review and approval to demonstrate aesthetic effects, color intent and set quality standards for materials and execution. Flooring mock up size must be a minimum of 10’ x 10’.

b. Raised Floor Requirements

N/A

c. Resilient Floor Finishes

Provide resilient floor finishes as identified in the Room Requirements or as directed below. Include manufacturer's full line of color, texture and pattern selections, including multi-colored materials.

In areas receiving new resilient flooring, the contractor will be responsible for properly preparing new flooring, per manufacturer’s requirements. Special attention may be required to eliminate product failure due to slab moisture, adhesive compatibility and improper floor prep and installation.

1. Resilient Sheet Flooring

a) Vinyl
N/A

b) Linoleum
N/A

c) Rubber
N/A

d) Static Dissipative
N/A

2. Resilient Tile Flooring

a) Luxury Vinyl Tile (LVT)
Provide solid vinyl tile in areas as indicated for floors with high durability, low maintenance, high slip-resistance requirements.

Solid vinyl tile must be planks or square tiles with protective urethane finish for ease of maintenance.

Solid vinyl tile must have an attached sound acoustical pad/baking or acoustical underlayment.

Provide a moisture barrier underlayment as required.

Wood look planks must have a beveled edge.

A minimum 40 mil product with a minimum 20 year manufacturer's written warranty is required.

Prior to turning over to the government, the contractor must thoroughly clean the new resilient flooring per manufacturer's recommended cleaning instructions and apply a protective finish coat of CENTI Finish, Diversey Carefree, Diversey Showplace, or similar, as recommended by the manufacturer.

Prior to commencing the LVT flooring installation, the contractor's flooring installer must submit proof of three (3) successfully installed LVT installations.

b) Rubber Tile
N/A

c) Linoleum Tile
N/A

d) Static Dissipative (SDT)
N/A

e) Vinyl Composition Tile (VCT)
N/A

d. <u>Tile Floor Finishes</u>

1. Porcelain Tile

Provide through-body, minimum 6" x 12", 6" X 24", 12" X 24" porcelain tile.

Tile shall be non-slip to comply with code requirements and include a light texture.

Texture of tile to be analyzed with regard to maintenance and selected based on a minimal maintenance program.

Provide epoxy grout all floor tile finishes.

2. Quarry Tile
N/A

3. Terrazzo Tile
N/A

e. Epoxy Terrazzo Floor System
N/A

f. Resinous Flooring

Provide shot blast and/or diamond grinding mechanical floor prep, per manufacturer's requirements. Preparation and testing methods must comply with the Part 4 requirements of this RFP and the manufacturer's requirements for concrete/slab preparation and calcium chloride or relative humidity testing.

Use a 5 coat system. Provide a 1/4" thick troweled epoxy mortar with a high solids epoxy base coat and 2 urethane topcoats.
Provide a decorative flake, multi-color quartz topping with 2 topcoats of clear urethane sealer.

Provide a moisture barrier as required.

Resinous flooring performance shall be consistent with use and shall be stain, chemical and wear resistant.

g. Base

Base heights must be consistent throughout, unless required otherwise.

Wall base must be 6" H., U.O.N.

Installation method to be per manufacturer's recommendation at CMU walls.

Resilient tile installations must receive continuous roll stock of thermoset rubber (TS), coved wall base. Precut base is not acceptable. Utilize the same color throughout project scope.
Epoxy flooring must receive integral cove base to match.

Porcelain tile floors must receive stainless steel sanitary cove strip between floor and wall tile.

Concrete floors must receive rubber base.

Resinous epoxy floor system must receive integral cove base to match.

Tile wall base units shall be pre-formed; cut tiles will not be allowed.

Provide stainless steel metal transition cap on top of tile base if integral cove capped tile is not available in selected pattern.

Provide stainless metal transition strips to be used between epoxy base and porcelain wall tile.

C3030 CEILING FINISHES

Provide ceiling finishes as indicated in Part 3 Chapter 5 "Room Requirements" portion of this RFP. Refer to the Living Room conceptual drawing in the Part 6 Attachments for additional ceiling and lighting information.

Provide ceiling material finish samples/colors for review and approval during the design phase of the project.

Select finished surface of ceiling tiles to address acoustical, maintenance, moisture or impact

resistance requirements of the room.

Primary ceiling finish should be suspended acoustical panel ceiling system in a smooth finish. Unless noted otherwise, this applies to all room types. Refer to Room Requirements for room locations.

Secondary ceiling finish is suspended gypsum board ceiling. Refer to Room Requirements for room locations.

Provide a combination of gypsum board ceiling and suspended acoustical ceiling tile down corridors. Provide accent painted drywall soffits to create interest.

Provide recessed can lighting and general lighting as required throughout in all living rooms.

Provide architectural ceiling features consisting of accent soffits, wood/metal ceilings, suspended acoustical clouds, specialty lighting, backlit panels and other integrated design elements in these key locations: entrance lobby, reception, multi-purpose/training room areas. Provide painted exposed structural system in Entrance area per the C10.

Provide a combination of various decorative light fixtures such as but not limited to: recessed can lighting, small, medium and large pendant light fixtures, and linear fixtures in these key locations, entrance lobby, reception, multi-purpose/training room areas.

Paint exposed structural systems in accordance wtih Part 4 PTS Section C3040 INTERIOR COATINGS AND SPECIAL FINISHES.

Provide ceiling finish materials to meet the following requirements:

a. Acoustic Ceiling Panels/Tiles

Size to be 24 inch by 24 inch by 3/4 inch minimum thickness. Acoustical panels must have a tegular edge. Provide fine fissured panel surface.

The new light fixtures must be 24 inches by 24 inches.

Sound diffusers 24” x 24”, inset in place of acoustical tile units.

b. Gypsum Board

These ceilings to be painted. Refer to section C3010 WALL FINISHES, PART A for paint sheen schedule.

The new light fixtures must be recessed 24 inches by 24 inches, U.O.N.

c. Specialty Ceiling System

C3030 above

d. Security Ceiling

Provide acoustic, metal security ceiling system as required.

Security ceiling tiles must prevent access to plenum spaces with concealed locking mechanisms.

C3040 INTERIOR COATINGS AND SPECIAL FINISHES

Paint all interior exposed surfaces except factory finished items that are not intended for field coating including but not limited to finished metals (copper, stainless steel, aluminum, brass and lead) door hardware, interior grilles, registers, diffusers, access panels, and panel boxes. With the exception of door hardware, all items to match adjacent wall unless noted otherwise.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

D10 CONVEYING

SYSTEM DESCRIPTION

Conveying System include elevators.

D1010 ELEVATORS AND LIFTS

Design assembly and arrangement of elevator, accessories, and supporting systems in accordance with American Society of Mechanical Engineers/American National Standards Institute (ASME/ANSI) A17.1 and UFC 3-490-06 Elevators. Provide all materials and equipment, including but not limited to elevator cab and hoist equipment, operating and signal fixtures, doors, door and car frames, car enclosure, controllers, motors, guide rails, brackets, and testing.

D101001 GENERAL CONSTRUCTION ITEMS

Provide a traffic analysis.

D101002 PASSENGER ELEVATORS

Provide passenger/freight elevators as required as a result of the final occupancy count and building configuration. Designed to carry furniture/ gurney and equipment items. Locate elevators in Lobby area, within visual control of the reception desk. Speed and rated load capacity of the elevator(s) shall be based on designer's survey of the facility user needs.

The freight elevators shall be sized to comply with the International Building Code (IBC) medical stretcher/gurney requirement and also designed to vertically transport the largest movable equipment or furniture used on the project.

Derive finishes and fixtures from Manufacturer's selections. Coordinate finishes with the interior architectural design, and meet the User's needs and functions. Coordinate the design of the elevator machine room with applicable codes and the elevator manufacturer's requirements.

Provide hydraulic elevators for elevator travel distances of 44 feet (13.41 meters) or less and electric traction elevators for travel distances greater than 44 feet (13.41 meters). Provide minimum hydraulic elevator car speed of 125 feet per minute (38.1 meters/ minute) for elevator travel distances of 15 feet (4.5 meters) or less and 150 feet/minute (45.7 meters/ minute) for hydraulic elevator travel distances greater than 15 feet (4.5 meters). Provide minimum electric traction elevator car speed of 350 feet per minute (106.6 meters/ minute).

Provide all required infrastructure support for the elevator operation and maintenance.

A copy of elevator submittals must be sent to Base Public Works attention of NAVFAC Elevator Inspector for review and acceptance.

-- End of Section --

6. ENGINEERING SYSTEMS REQUIREMENTS

D20 PLUMBING

Refer to Part 4 Section D20 for performance requirements of the building elements included in the plumbing system.

SYSTEM DESCRIPTION

The plumbing system consists of all fixtures, potable cold and hot water piping and equipment, piping insulation, water heating equipment, sanitary waste and vent piping systems, and other specialty piping and equipment within 5 foot (1.5 meter) of the building. Refer to Building Requirements, Space Tabulations Section of the Project Program for building occupancy levels.

GENERAL SYSTEM REQUIREMENTS

Provide working space around all equipment. Provide concrete pads under all equipment. Provide all required fittings, connections and accessories required for a complete and usable system. Install all equipment in accordance with the criteria of PTS section D20 and the manufacturer's recommendations. Design and install in accordance with International Plumbing Code (IPC) and UFC 3-420-01, *Plumbing Systems*. Where the word "should" is used in the manufacturer's recommendations, substitute the word "must".

Include the plumbing system to list of systems to be commissioned in accordance with Part 2 UFGS Section 01 33 29, *Sustainability Requirements and Reporting*.

Provide plumbing system assemblies which include piping, pipe fittings, materials, connections, valves, pipe insulation, pipe support, and any additional accessories as required for a complete and usable system. The design and construction shall be in accordance with the latest editions of the following:

- INTERNATIONAL PLUMBING CODE (IPC)
- UFC 3-420-01 PLUMBING SYSTEMS
- INTERNATIONAL ENERGY CONSERVATION CODE
- INTERNATIONAL MECHANICAL CODE

D2010 PLUMBING FIXTURES

Provide quantity and type of plumbing fixtures required for the occupancy, use, and functions described for this facility. Provide handicapped fixtures in accordance with the referenced criteria in the Project Program.

D201001 WATER CLOSETS

Provide floor mounted dual-flush valve, manual type water closets in all Room Plan bathroom spaces, one per bathroom.

Provide floor mounted dual-flush valve, manual type water closets in the Public Head spaces. The Public Head must be accessible per ABA.

Provide a floor mounted dual-flush valve, manual type water closet in the Duty Office Head. The Duty Office Head must be accessible per ABA.

Provide only manual activated valves or manually activated flush meter valves.

D201002 FLUSH VALVE TYPE HANDICAPPED URINALS

Provide flush valve type handicapped urinals in the Public Head.

Provide only manual activated valves or manually activated flush meter valves.

D201003 LAVATORIES

Provide a countertop lavatory made of solid surfacing material in each Room Plan bathroom space. The countertop lavatory in the Room Plan bathrooms must be the under mounted type. Provide solid surface backsplash.

Provide a wall mounted lavatory made of vitreous china with a straight back in the Public Head. The wall mounted lavatory in the Public Head must be handicapped accessible.

Provide a wall mounted lavatory made of vitreous china with a straight back in the Duty Office Head. The wall mounted lavatory in the Duty Office Head must be handicapped accessible.

Provide only manual activated valves or manually activated flush meter valves.

Provide washerless faucets at lavatories.

All wall mounted fixtures shall have concealed steel angles attached to framing with backing on concealed legs below countertop.

D201004 SINKS

Provide a countertop kitchen sink with one compartment in the Room Plan service area. Kitchen sink must be provided with hot and cold water connections.

All sinks to be under mount.

Provide a stainless steel large “bar” type sink with one compartment in the Living Room Plan service area. The bar” type sink must be provided with hot and cold water connections.

Provide a double stainless steel sink in built-in cabinetry in the Kitchen. Kitchen sink must be provided with hot and cold water connections.

Provide a countertop kitchen sink with one compartment in the Multi-purpose room. Kitchen sink must be provided with hot and cold water connections.

Provide a single large/deep stainless steel sinks in built-in cabinetry in the Laundry room. Laundry room sink must be provided with hot and cold water connections.

Provide a mop sink with hot and cold water connections in the Janitor's room.

D201005 SHOWERS

Provide pre-cast terrazzo shower floor receptors in each Room Plan bathroom, and provide solid surface surround shower enclosures with hot and cold water connections and fittings. The shower heads must be stationary to keep from spraying toward the shower entrance opening and causing

water damage.

Provide a gear wash area at the ends of the BEQ wings and near the entrances for the purpose of washing boots and other gear. The gear wash area must be located outside prior to entering the BEQ, and located on an 2.4 meter (8 foot) diameter depressed slab for drainage. Do not locate the gear wash area at the front entrance to the BEQ. The gear wash area must provide a shower post in the middle of the 2.4 meter (8 foot) depressed drainage slab. The shower post must be a manufactured item and have 6 shower heads, each equipped with shutoff valves that are easily accessed by personnel for washing gear. The gear wash area shower post must be approximately 1.8 meter (6 feet) high, and be provided with hot and cold water connections and fittings. Provide a drainage pipe in the center of the depressed drainage slab. All external water piping must be freeze proof in areas prone to freezing.

Provide single lever faucets at tub/showers or shower stalls and flow restrictive type showerheads at showers.

D201006 DRINKING FOUNTAINS AND COOLERS

Provide water coolers with bottle filling features in interior public areas, and drinking fountains in appropriate exterior areas.

D2020 DOMESTIC WATER DISTRIBUTION

Perform a flow test to determine system requirements and provide an associated report. At a minimum, report must contain the following results:

Date:
Time:
Location:
Static pressure:
Residual pressure:
Flow:

D202001 PIPES AND FITTINGS

Provide copper tubing and fittings for above ground and buried piping. No pressure tubing except water service entrance and trap primers is permitted under the floor slab.

D202002 VALVES & HYDRANTS

Provide shutoff valves at domestic water supply to each floor. Provide shutoff valves at water supplies to fixtures and to provide ease of maintenance as required in the IPC. Provide hose bibbs on the roof, in mechanical room(s) and along the building exterior such that all points along the perimeter can be reached with a 30 meter (100 foot) long hose.

Provide standard flush meter valves, shower mixing valves and basin faucet.

D202003 DOMESTIC WATER EQUIPMENT

Provide two Lead-Lag high efficiency natural gas fired water heaters for heating of domestic water. Each water heater should be sized for 65% of total required load.

Provide a domestic hot water storage tank.

Hot water storage tank must be sized for BEQ's morning peak time when most tenants will be using the restrooms and showers.

Provide thermostatic mixing valves for domestic hot and cold water distribution system per UFC 3-420-01 PLUMBING SYSTEMS.

Provide redundant (N+1) in-line recirculation pumps with isolation valves and recirculation loop with all associated fixtures, equipment, and appurtenance.

Provide reduced pressure type backflow preventer and water meter assembly with "Y" strainer for the building at the domestic water service entrance outside the building.

Provide a reduced pressure principle type backflow preventer at all domestic make-up water lines and at all make-up water lines to systems containing chemical treatment.

All meters must comply with Base current metering system requirements. Refer to ESR G30 for water meter requirements.

Provide water meter compatible of integrating with existing basewide Advanced Metering Infrastructure (AMI) System. Existing AMI system uses radio frequency for the capturing metering data.

Provide an architectural screen for backflow preventers located outside.

Provide all other required equipment for a complete and useable system.

SOLAR HEATING HOT WATER SYSTEM

Provide a complete solar domestic hot water system including heating panels, install the thermal panels in a maintenance accessible location, ground or roof supports, piping, pumps, hot water storage tanks, heat exchangers and controls. Provide an integrated solar thermal hot water system for domestic water system, designed per UFC 3-420-01 section 501.10 Solar water heating.

The thermal panels maybe installed above shade at the surface parking or building roof or some other locations determined during the design phase. Provide all necessary electrical wiring connections and DDC control system, If the solar domestic hot water system is located on the roof, provide a coordinated design of the roof elements in accordance with UFC 3-110-3 Roofing. Organize the roof space necessary to accomplish the functions the roof has to provide, minimize roof penetrations, and plan the roof to facilitate future reroofing of the facility. Select the roof type and detail roof mounted equipment to complement the implementation of the functions that have to take place on the roof and minimize the need for routine maintenance. Accomplish a Pre-Roof Design Conference prior to the design of the roof.

Solar Domestic Hot Water Systems (SDHWS) are required by the Energy Independence and Security Act (EISA 07) where Life Cycle cost effective. Evaluate the building and building site for roof orientation, roof area available for solar panels, roof type, and other relevant issues to ensure that the SDHWS is compatible with the project.

Provide a closed (not open) solar thermal system. There shall be a heat exchanger between the solar thermal system and the domestic water system.

Provide an energy meter to ascertain the energy savings from the solar thermal system.

Provide gauges and balancing valves such that TAB can be accomplished on the domestic water and solar thermal system.

D202004 INSULATION & IDENTIFICATION

Provide mineral fiber insulation with vapor barrier on domestic hot water supply and recirculation piping. Provide Elastomeric foam insulation with vapor barrier on domestic cold water supply piping. Provide identification for piping and equipment.

D202005 SPECIALTIES

Provide recessed washing machine connector box for clothes washers in the Laundry room. Provide ice maker connector boxes for refrigerators in the Room Plan service area.

Provide all required components for stackable dryers.

D202090 OTHER DOMESTIC WATER SUPPLY

Provide piping supports in accordance with the IPC. Provide inspections, disinfection, and testing in accordance with the IPC.

D2030 SANITARY WASTE

D203001 WASTE PIPE & FITTINGS

Provide cast iron hub and spigot pipe and fittings for underground installation.

Provide cast iron hub-less pipe and fittings, rubber compression gasket joints for above ground installation.

Provide easily accessible wall or floor cleanouts in restrooms and kitchen area.

D203002 VENT PIPE & FITTINGS

Provide cast iron hub and spigot pipe and fittings for underground installation.

Provide cast iron hub-less pipe and fittings and rubber compression gasket joints for above ground installation.

D203003 FLOOR DRAINS

Provide floor drains in Mechanical room(s), Fire Pump room(s), Laundry room, kitchen area, janitor rooms, plumbing chase areas, and any other areas required to receive condensate from air handling equipment that is not located in the mechanical room. Provide trap primers or deep seal traps on "P" traps that do not regularly receive water.

D203004 SANITARY & VENT EQUIPMENT

Provide a sump pump in the elevator shaft pit.

D2040 RAIN WATER DRAINAGE

See section B30 "Roofing" for rain water drainage systems.

D204002 ROOF DRAINS

Provide roof drains that are compatible with the roofing system.

D204004 INSULATION & IDENTIFICATION

Provide the same as domestic water piping.

D2090 OTHER PLUMBING SYSTEMS

D209001 SPECIAL PIPING SYSTEMS

Refer to ESR D30 HVAC for natural gas piping system.

Contractor is responsible for any applications and permits, and provide the complete natural gas system from the load side of the utility meter to the heating equipment. The contractor shall have the local gas utility provider install piping and appurtenances up to the load side of the meter.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

D30 HVAC

Refer to Part 4 Section D30 for performance requirements of the building elements included in the HVAC system.

SYSTEM DESCRIPTION

Provide heating, ventilating and air conditioning (HVAC) systems for the BEQ that attains the following objectives: Occupant comfort, Indoor air quality, Acceptable noise levels, Energy efficiency, Reliable operation, and Ease of maintenance. Design and install in accordance with the International Mechanical Code (IMC), including the IMC supplemental requirements within UFC 3-410-01, UFC 3-401-01, *Mechanical Engineering* and UFC 4-721-10, *Navy and Marine Corps Bachelor Housing*. LonWorks items in UFC 3-410-02 are not applicable when identified in UFGS 23 09 00, UFGS 23 09 23.02 and UFGS 23 09 13. Refer to Building Requirements, Space Tabulations Section of the Project Program for building occupancy levels.

Any combination of equipment that attains these goals, and meets the requirements outlined below, will be acceptable.

Direct expansion multizone systems, direct expansion variable air volume systems, and thru-the-wall units are not acceptable.

VAV System Description: All conditioned spaces within the BEQ with the exception of the Mechanical room, Fire Pump room, Telecommunication/Data/NMCI room, and Electrical room must be heated and cooled by variable air volume (VAV) units. All VAV units must include hot water reheat coils, must operate independently, and be controlled by wall mounted adjustable temperature sensors. Design the hot water piping system for the reheat coils as a reverse return system. All VAV units must be accessible for maintenance. Access to VAV units located above ceilings must be through lockable and hinged ceiling access panel(s) of sufficient size to allow removal of mechanical equipment without damage or demolition of ceiling. Cooling for the VAV units must be provided by a chilled water central station VAV air handling unit(s) located in the mechanical room(s). Route all cooling coil condensate from the VAV air handling unit(s) to a floor drain in the mechanical room. Locate mechanical equipment rooms on each floor and in each wing if necessary. Attic space may be used for mechanical equipment if there is suitable access for maintenance purposes. Deliver outside ventilation air for the facility through the VAV air handling unit(s) in compliance with the latest edition of ASHRAE 62. Maintain a constant volume of outside air ventilation through the central station VAV air handling unit by using an injection fan and a constant volume terminal with a pressure independent velocity controller in order to keep the ventilation airflow constant as the VAV air handling fan modulates.

Provide direct drive series fan powered type VAV units for the Room Plan, Offices, Multi-purpose room, Public spaces, Lobbies, and Corridors. Return air back to the VAV boxes must be through return filter grilles. Provide each Room Plan closet with a minimum 7 L/s (15 CFM) of conditioned supply air.

Provide direct drive series fan powered type VAV units for the Laundry room. No conditioned air from the laundry room may be returned or transferred to other spaces. Return air back to the VAV boxes must be through return filter grilles.

VAV units shall be double-inlet type with forward curved blades and control primary air volume to

within plus / minus 5 percent of each air set point as determined by the thermostat with variations in inlet pressure from 3/4 to 6 inch water gauge.

Ventilation Systems: Outside ventilation air for the BEQ must be provided by an independent and dedicated outside air system (DOAS), and comply with the latest edition of ASHRAE 62. Maintain a constant volume of outside ventilation air to each Room Plan and all other spaces. Provide each Room Plan with a minimum of 50 CFM of ventilation air. Ventilation air to each space must exceed room exhaust air to ensure all time positive pressure inside the Room Plans. Provide an independent and dedicated packaged ventilation system for the Multi-purpose room. The ventilation system for the Multi-purpose room must be controlled via O2 sensor(s). The ventilation systems must preheat, cool, and reheat to neutral conditions all outside ventilation air prior to entering a space. Locate mechanical equipment rooms throughout the BEQ as necessary. Attic space may be used for mechanical equipment if there is suitable access for maintenance purposes. For flat roof building, mechanical equipment may be installed on the roof. Route all cooling coil condensate from the dedicated ventilation system(s) to a floor drain.

The Telecommunication/Data/NMCI room must be cooled only via a ductless split air conditioner . Provide minimum base ventilation rates as defined by the latest edition of ASHRAE 62. Provide the minimum base ventilation rate for this space by an adjacent air system from another space.

Exhaust Systems: Provide continuous exhaust air for the Room Plan bathrooms, Laundry room, Janitor's room, Public Head, and Duty Office Head. The exhaust air for these spaces must be part of a central exhaust system that routes all exhaust air through an energy recovery wheel to exchange heat between the outgoing exhaust air and the incoming ventilation air. Continuous exhaust air for the Room Plan bathrooms must be 40 CFM). Continuous exhaust air for the Public Head, Duty Officer Head, and Janitor's room must be 50 CFM. Static pressures for these spaces must be negative as compared to adjacent spaces.

Energy Recovery System: If Life Cycle Cost Effective, provide total energy (enthalpy) type energy recovery wheels (heat wheels) in the air handling system for recovering energy between the outgoing exhaust air and the incoming ventilation air. The total enthalpy heat wheel(s) must be located in the mechanical room or the attic space, and must be easily accessible for maintenance.

Mold and Mildew: The BEQ must have no evidence of mold or mildew due to condensate moisture on indoor surfaces after one year of service.

GENERAL SYSTEM REQUIREMENTS

Provide working space around all equipment. Provide all required fittings, connections and accessories required for a complete and usable system. Install all equipment in accordance with the criteria in RFP Section D30 and the manufacturer's recommendations. Where the word "should" is used in manufacturer's instructions, substitute the word "must".

Provide air conditioning and heating for spaces as indicated and for the following Design conditions:

Outside Conditions					
Summer	89	Degrees F dry bulb	Winter	37	Degrees F
	67	Degrees F wet bulb			

Inside Conditions					
Summer	75	Degrees F dry bulb	Winter	70	Degrees F
	-	Percent RH			

NMCI/Telecommunications Room Inside Conditions					
Summer	65-75	Degrees F dry bulb	Winter	65-75	Degrees F
	30-55	Percent RH			

Provide Ventilation rates and systems in accordance with ASHRAE Standard 62.1, *Ventilation for Acceptable Indoor Air Quality*.

Provide outside air ventilation rates and systems in accordance with ASHRAE Standard 62, *Ventilation for Acceptable Indoor Air Quality*. Provide negative pressure in restrooms, cooking and waste areas to avoid odors being carried into the public areas. Other areas including BEQ living units must be positively pressurized.

Configure the HVAC system for the BEQ to provide each zone with the choice of heating or cooling year round. Provide each zone with its own limited range of control, as allowed by the control system central workstation.

Zone the HVAC system as follows:

Zones requiring airflow from central air handling system

Each Room Plan must be a separate zone.
Each Office must be a separate zone.
The Multi-Purpose Room must be a separate zone.
The laundry room.

Zones requiring adequate air flow from adjacent spaces air to maintain stated temperatures are as follows:

i. Public Toilets
ii. Private Toilets
iii. Corridors
iv. Janitorial Rooms

Zones requiring dedicated cooling units to maintain stated temperatures are as follows:

i. Mechanical Room
ii. Electrical Room
iii. Telecommunication Rooms
iv. Fire Pump Room

Each Room Plan must be a separate zone.

The Mechanical room and Fire Pump room shall be a separate zone conditioned in accordance with equipment operating requirements.

The Electrical room shall be a separate zone conditioned in accordance with equipment operating requirements.

Noise levels must comply with the requirements for Hotels/Motels in the ASHRAE Applications Handbook.

All outside mechanical equipment HVAC cooling/heating and condenser coils shall be provided with a manufacturer approved coating system. All cooling/heating and condenser coils shall be copper to copper Construction.

All outside mechanical equipment shall be finished to protect against desert environment.

Provide mechanical connections and concrete pads for chillers, boilers, pumps and all equipment for future installation of Chillers. Refer to RFP Part 3, Chapter 6, Section D50, Electrical, for additional information.

Material and Equipment Qualifications: All materials and equipment must have been in satisfactory commercial or industrial use for 2 years prior to the bid opening. The 2-year use must include applications of equipment and materials under similar circumstances and of similar size. The product must have been for sale on the commercial market through advertisements, manufacturer's catalogs, or brochures during the 2-year period.

Motors: Single-phase fractional-horsepower alternating-current motors must be high efficiency types corresponding to the applications listed in NEMA MG 11. Select polyphase motors based on high efficiency characteristics relative to the applications as listed in NEMA MG 10. Additionally, all polyphase squirrel-cage medium induction motors with continuous ratings must meet or exceed energy efficient ratings per Table 12-10 of NEMA MG 1. Provide controllers for 3-phase motors rated 0.75 kW (1 hp) and above with phase voltage monitors designed to protect motors from phase loss and over/under-voltage. Provide means to prevent automatic restart by a time adjustable restart relay. For packaged equipment, the manufacturer must provide controllers including the required monitors and timed restart. Provide reduced voltage starters for all motors 25 hp and larger.

Provide minimum 6-inch (153 mm) thick concrete housekeeping pads and vibration isolators under all floor-mounted equipment.

Provide dual technology (infrared detector and motion) occupancy sensor to determine individual berthing quarter is occupied. Locate occupancy sensor on ceiling.

Provide cooling and heating set points based on occupancy.

For unoccupied mode, provide the following night setback temperatures:

For winter, 10 degrees F (6 degrees C) lower than indoor heating design conditions, but no lower than 55 degrees F (12.8 degrees C).

For summer, 5 degrees F (3 degrees C) higher than indoor cooling design conditions, but no higher than 85 degrees F (29.4 degrees C).

Hookups shall be piped to an outdoor location suitable for a temporary chiller system placement. Hookups shall be 4" grooved fittings having supply and return isolation valves installed.

Provide seismic restraints and comply with UFC 4-010-01 Department of Defense Minimum Standards Antiterrorism for Buildings (ATFP).

Provide sufficient height and space for easily accessible isolation valves to all equipment and fixtures in the attics. All isolation valves and equipment installed in the attics must have walking access. Provide isolating valves for all vertical shafts and horizontal branches.

Do not install any exposed conduit ducts, etc. in public areas.

D3010 ENERGY SUPPLY

D301002 GAS SUPPLY SYSTEM

Obtain natural gas pressures from the local natural gas utility provider (the base). Provide any applications and permits and provide the complete natural gas system from the load side of the utility meter to the heating equipment. Contract with the local natural gas utility provider for installation of piping and appurtenances up to the load side of the meter.

Provide gas meter on the building main and tie meter into the existing Advanced Metering Infrastructure (AMI) metering system.

Provide natural gas supply as required to the HVAC system. Provide natural gas supply to the laundry room to serve clothes dryers. Provide seismic gas shutoff valves certified by the State of California per applicable regulatory requirements.

Provide seismic gas shutoff valves certified by State of California per applicable regulatory requirements.

Provide in addition to the normal shutoff valve, prior to the gas regulator at the meter, a category 1 Excess Flow Valve (EFV) and service isolation valve, located below grade within an approved valve box. EFV shall be in compliance with the requirements of MSS SP-115 and US DOT CFR Title 49, Part 192.381. Provide in accordance with manufacture’s recommendations and code requirements.

Do not locate meter or transition medium pressure gas to meter within the facility where at all practical. Follow ATFP Interim Guidance on Fragile Utilities dated 6-14-2005.

D3020 HEAT GENERATING SYSTEMS

Provide a heating system for this facility.

D302001 BOILERS

Provide condensing boilers fire tube boilers in a cascading control arrangement. Provide with N+1 redundancy. Boiler shall be CSD-1 compliant and ASME inspected and stamped for system working pressure.

D302005 EQUIPMENT THERMAL INSULATION

Provide insulation for all hot water piping and equipment.

D3030 COOLING GENERATING SYSTEMS

D303001 CHILLED WATER SYSTEMS

Provide a two variable speed rotary screw air-cooled chillers each sized for 65%-75% of the total cooling capacity. Utilize a variable primary pumping system.

Chillers must be capable of continually operating down to 25% rated capacity.

Provide a 150 mm (6 inch) thick reinforced concrete housekeeping pad. Provide heat tape for freeze protection of chilled water piping and any other associated appurtenances.

Provide chiller piping isolation valves at all floors and wings.

Provide a chilled water storage tank to ensure chillers do not short cycle.

Provide factory corrosion protection coating on coils.

Provide insulation and vapor barrier on all chilled water equipment.

Provide chiller controls with DDC communication cards. Wire and interface chillers to the building level DDC network.

Provide complete manufacture start-up and operational testing of chiller equipment.

D303002 DIRECT EXPANSION SYSTEMS

Provide a dedicated air-cooled direct expansion ductless split cooling only unit for cooling the Telecommunications/Data/NMCI room. The ductless split cooling only unit must cool all telecommunication/data/NMCI equipment loads within the room. Provide with a wall mounted adjustable thermostat.

Provide an independent, dedicated heating and cooling system for each elevator MR, CR, and MS. Design heating and cooling system per UFC 3-490-06.

D3040 DISTRIBUTION SYSTEMS

D304001 AIR DISTRIBUTION, HEATING & COOLING

Provide insulated, galvanized steel ductwork constructed, braced, reinforced, installed, supported, and sealed in accordance with the IMC and Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) standards.

Provide grilles, registers, and diffusers. Provide linear slot diffusers including boot where indicated by the architect and interior designer in public areas, locations to be identified during the design phase process.

Limit the length of flexible ducts to straight runs of 5 feet. Do not use flexible ducts for elbows, including connection to diffusers; provide elbows at ceiling diffusers.

Provide VAV fan powered units

Provide a Variable Air Volume (VAV) system using ducted returns. Locate VAV box units above ceilings and allow for maintenance and removal of units through lockable access panels Provide grilles, registers, and diffusers.

Provide strip/linear diffusers in all public areas

Provide supply diffusers at the end of hallways and corridors to ensure the entire area is conditioned.

Size/provide all corridor grills to integrate with corridor lay-in ceiling layout.

All VAV units must include electrical reheat coils, must operate independently, and be controlled by wall mounted adjustable temperature sensors. All VAV units must be accessible for maintenance. Access to VAV units located above ceilings must be through lockable and hinged ceiling access panel(s) of sufficient size to allow removal of mechanical equipment without damage or demolition of ceiling. Cooling for the VAV units must be provided by a chilled water central station VAV air handling unit(s).

D304003 HOT WATER DISTRIBUTION SYSTEMS

For exterior buried Hot Water Distribution Systems see Section G30, *Site Civil/Mechanical Utilities*.

Provide a primary variable speed pumping system with N+1 redundancy to serve the HVAC hot water equipment throughout the facility. Provide insulated copper hot water supply and return piping to serve the HVAC equipment throughout the facility.

Provide air control and shot type feeder for manual chemical feed for hot water piping system.

Provide an expansion tank for the hot water piping system.

Provide system flushing and start-up for the hot water piping system.

D304006 CHILLED WATER DISTRIBUTION SYSTEMS

Provide a primary variable speed pumping system with N+1 redundancy to serve the HVAC chilled water equipment throughout the facility. For exterior buried chilled water distribution systems, coordinate with Section G30, *Site Civil/Mechanical Utilities*.

Pumps are to be direct drive.

For below ground chilled water supply and return piping that serve the HVAC equipment throughout the facility, Provide steel pipes and fittings. Insulate piping with either fiber glass or foam insulation with protective jacket.

For above ground chilled water supply and return piping system, provide copper type K tubing and fittings. Insulate piping with either fiber glass or foam insulation with protective wrap.

Provide air control and shot type feeder for manual chemical feed for the chilled water piping system.

Provide an expansion tank for the chilled water piping system.

Provide system flushing and start-up for the chilled water piping system.

For all exterior mechanical equipment, avoid any buried pipes runs due to high temperature soil use a covered trench or overhead in a covered walkway (hidden from view).

Provide temporary chiller hookups. The location of hookups must allow the use of the building pumps.

D304007 EXHAUST SYSTEMS

Central Exhaust System: Provide a ducted central exhaust ventilation system(s) and exhaust fan(s) to serve all ventilated zones of the facility. Provide in-line centrifugal exhaust fan(s) for the BEQ central exhaust system. The BEQ central exhaust system must capture all Room Plan bathroom, Laundry room, and other space exhaust air, and route it through a total energy (enthalpy) type energy recovery wheel (heat wheel) before exiting the BEQ in order to gain heat transfer between the incoming ventilation air and outgoing exhaust air. The central exhaust system ductwork may be routed through a chase adjacent to the Room Plan showers as shown on attached sketches in part three of the project program.

Multi-Purpose Room Exhaust System: Provide an additional inline centrifugal exhaust fan in the multi-purpose room that is interlocked with the Multi-purpose room dedicated ventilation system. The Multi-purpose room exhaust fan must discharge to the outside all ventilation air and balance system. Provide a positive pressure in the Multi-purpose room in accordance with ASHRAE recommendations.

Stacked Dryer Exhaust System: Exhaust air from the stacked dryers in Laundry room must be discharged outside. Provide a dryer plenum/chase area as shown on the attached sketches. Dryer exhaust ducts must route through dryer plenum/chase area to an exterior intake/exhaust louver. Dryer intake air must be drawn into the dryer plenum/chase area through the exterior intake/exhaust louver and enter the rear of the dryers. This method prevents the need for conditioning dryer makeup air.

D304008 AIR HANDLING UNITS

Provide chilled water central station variable-air-volume (VAV) air handling unit(s) to serve the BEQ. The central station VAV air handling unit(s) must deliver conditioned air to the VAV units at a constant temperature of 12.8 degrees Celsius (55 degrees Fahrenheit). Provide the central station VAV air handling unit(s) with a hot water coil for pre-heating the outside ventilation air if necessary and provide with Minimum Efficiency Reporting Value 2 inch thick MERV 8 pre-filters and 2 inch thick MERV 13 final-filters.

Provide automatic modulating outdoor air intake control.

Locate VAV Air Handlers to minimize the duct sizing.

Blade damper types must be opposed blade.

When ventilation is used for cooling purposes provide suitable ventilation to ensure that indoor space temperature do not exceed 10 deg. F above ambient temperature on design day. Provide engineering calculations for Government review that clearly demonstrate that the ventilation rate derived supports the performance criteria.

D304090 OTHER DISTRIBUTION SYSTEMS

Provide base mounted circulating pumps with variable frequency drives.

Provide chemical treatment systems for the hot and chilled water systems.

D3060 CONTROLS AND INSTRUMENTATION

D306001 HVAC CONTROLS

D306001 1.1 DIRECT DIGITAL CONTROLS (DDC)

Provide a complete Direct Digital Control (DDC) system [to comply with UFGS 23 09 00, *Instrumentation and Control for HVAC,* UFGS 23 09 23.02, *BACnet Direct Digital Control for HVAC and Other Building Control Systems,* UFGS 23 09 13, *Instrumentation and Control Devices for HVAC*, and BACnet communication protocol.

Provide a DDC system which will communicate with the existing basewide Energy Monitoring and Control System.

Provide a DDC system, which will communicate with the existing base wide HVAC monitoring and control system. DDC system must seamlessly integrate into the existing base wide system.

Provide a fully functional DDC system that will operate standalone and not be IP network dependent for system graphics, programming, or database access.

Provide visual block programming language DDC language. Visual block programming language must be non-proprietary, “and other minimum control points required by UFC 3-410-01, Table D-1.”

Provide front-end and stand-alone laptops. Although system is to be stand-alone, it shall also be capable of being networked once the base obtains ATO.

The ATFP emergency shutdown button shall be located in the Duty Office by the Duty desk.

Contractor shall provide training of sufficient length such that the maintenance personnel will be able to maintain and operate the controls system.

Provide meters, monitored by DDC, on the following subsystems for potable water and reclaimed water: makeup and blowdown, hot-water boiler(s),.

Provide ASHRAE Standard 135 building controller as the main interface for the building control system.

Provide patch panel in the mechanical equipment room and mechanical yard for ease of connection and disconnection of equipment.

Provide panels with locks and alarms. The alarms must include both a flashing light and an audible alarm inside the mechanical room. The alarms must also be a networked alarm (e.g. switch connected to controller DI) with alarm events recorded remotely for a period not less than one year.

Provide water flow rate meters, monitored by the DDC system, for all applicable systems.

Provide air handlers and all terminal units, including VAV boxes, with discharge/supply temperature sensors.

Provide central air handler unit outside air CFM airflow monitoring stations.

Provide a DDC option for automatic operation of building circulating pumps whenever outdoor air temperature is below 35 degrees F or when there is a high potential for freeze damage.

Provide automatic and manual changeover capability for chillers and boilers.

Provide control to automatically start back-up pumps (or other HVAC equipment) if the primary device fails. Primary and back-up equipment starter circuits must be wired to prevent both pieces of equipment from operating at the same time. Rotate primary and back-up HVAC equipment monthly (adjustable) with a lead/lag control routine.

The facility should have the capability to control set points or schedules per wing or per floor.

D306001 1.2 ELECTRONIC CONTROLS

Provide electronic controls with programmable thermostats for the HVAC systems and equipment.

D3070 SYSTEMS TESTING AND BALANCING

Provide complete Testing and Balancing (TAB) of all air and water distribution systems and HVAC equipment and performance verification testing (PVT) of all HVAC controls systems.

D307003 HVAC COMMISSIONING

Refer to RFP Part 3 - Project Program, Chapter 2 for Building Commissioning requirements. Mechanical systems to be commissioned, if provided, include HVAC systems and controls, refrigeration systems and controls, renewable energy systems, and domestic hot water systems.

Commission HVAC systems and DDC controls using Government furnished and not contractor owned equipment. Refer to RFP Part 2 –Requirements, commissioning section.

Manufacturing representative to start-up the system.

D3090 OTHER HVAC SYSTEMS AND EQUIPMENT

D309001 GENERAL CONSTRUCTION ITEMS

Provide seismic restraints in accordance with UFC 1-200-01, UFC 3-310-04 and Project Program requirements. Comply with Antiterrorism standards of UFC 4-010-01.

Provide access (roof hatches, stairs, ladders, ramps, etc.) to all mechanical equipment rooms through the building exterior walls.

Provide mechanical equipment rooms (other than ground floors) with through the wall access doors on building exterior - crane access - with removable hand rails.

Provide minimum 12 inches space between vending machines and wall for proper air circulation.

-- End of Section –

6. ENGINEERING SYSTEMS REQUIREMENTS

D40 FIRE PROTECTION

Refer to Part 4 Section D40 for performance requirements of the building elements included in the fire protection systems. Design and construction must comply with all requirements in UFC 1-200-01, UFC 3-600-01 and UFC 4-021-01. Refer to Whole Building Design Guide website (https://www.wbdg.org/ffc/dod/unified-facilities-criteria-ufc) for the latest UFC copies.

SYSTEM DESCRIPTION

Provide an integrated fire alarm, mass notification system and suppression system capable of notifying building occupants and controlling any fire that may start inside the facility. The fire alarm and fire suppression systems must provide complete fire protection coverage throughout all spaces in the scope of work.

GENERAL SYSTEM REQUIREMENTS

Provide working space around all equipment. Provide concrete pads under all equipment. Provide all required fittings, connections and accessories required for a complete and usable system. Install all equipment in accordance with the criteria of PTS section D40 and the manufacturer's recommendations. Where the word "should" is used in the manufacturer's recommendations, substitute the word "must".

All Design Documents, (i.e. Building Code/Life Safety Analysis, plans, specifications, and calculations) developed for Section D40 must be prepared by, or under the supervision of the design/build contractor's Qualified Fire Protection Engineer, the Fire Protection Designer of Record (FPDOR).

Installation drawings, shop drawings or working plans, calculations, other required pre-construction documentation and as-built drawings must be prepared by, or under the direct supervision of a National Institute for Certification in Engineering Technologies (NICET) engineering technician as specified below. NICET engineering technicians must hold a current certification as an engineering technician in the field of Fire Protection Engineering Technology with minimum Level III certification in the appropriate subfield. Individuals responsible for work specified in D4090 must hold a Level IV certification in the Special Hazards Suppression Systems subfield.

Construction surveillance and inspections shall be provided by the Fire Protection QC Specialist. (QCFPE). See Part 4, section D40. Provide training for the active systems consisting of two (2) eight (8)-hour sessions to accommodate all shifts of the base fire department and allow for rescheduling for unforeseen fire department responses.

Fire sprinkler and fire alarm shop drawing level designs with manufacture's catalog data and calculations must be provided in the Pre-final (100%) design submittal.

D4010 FIRE ALARM AND DETECTION SYSTEMS

Provide an integrated fire alarm, and mass notification systems capable of notifying building occupants inside the facility. Provide a complete, electrically supervised, addressable intelligent, manual and automatic, annunciated fire alarm and detection system throughout the facility. Provide a voice evacuation type system that also serves as a mass notification system. Provide integrated systems capable of notifying building occupants by means of tones, strobes, prerecorded and live voice announcements. The fire reporting portion of the system must be compatible with the existing

base fire reporting system. Provide a complete and useable fire alarm system including manual stations, system smoke detectors, duct smoke detectors, heat detectors, audio/visual alarms, fire alarm radio transmitter, electrical supervision of all sprinkler system alarm and supervisory devices, and electrical supervision of fire pump controllers.

Provide a fire alarm control panel capable of handling a minimum of 500 individually identified sensors within the main control panel. Provide Class A, Style Z Notification Appliance Circuits, Class B, Style 4 Signaling Line Circuits, and Class B, Style A Initiation Device Circuits. Provide back-up amplifiers for combination fire alarm/mass notification systems.

Provide sounder bases for smoke detectors within dwelling areas. Fire alarm system must be programmed such that activation of a dwelling unit smoke detector causes all detector sounder bases within that unit to alarm and a supervisory signal to be activated at the fire alarm control panel. Activation of any subsequent smoke detector must activate the building evacuation alarm.

Provide surface mounted manual pull stations.

Provide a remote annunciator located at the duty desk.

Ceiling mounted smoke detectors shall be located 36” minimum distance from the blade tips of ceiling fans.

The fire alarm/MNS systems must be compatible with the existing WAVES base-wide MNS system manufactured by MADAHCOM. Provide sufficient space adjacent to the fire alarm/MNS panel for the government provided and installed MNS transceiver panel. A minimum 1-1/2" conduit from the transceiver location to 4 ft. above the roof-line with a roof mounted weather-head must be provided for the future antenna installation. Conduits must also be provided from the fire alarm/MNS panel to the transceiver panel location for future power and panel interconnections.

D4020 FIRE SUPPRESSION WATER SUPPLY AND EQUIPMENT

Base hydraulic calculations on a static pressure of 84 psig (gauge) (579 kPa) with 1,430 gpm (5,413 L/m) available at a residual pressure of 80 psig (gauge) (552 kPa) at the junction with the water distribution piping system.

Provide the incoming sprinkler service with a double check backflow preventer.

Provide a freestanding pedestal type fire department connection located no closer than 40 ft from the building and accessible by fire apparatus.

D4030 STANDPIPE SYSTEMS

Provide a Class I standpipe system where required by criteria.

The building standpipe system and sprinkler system must be fed from the same supply as a combined system.

D4040 SPRINKLER SYSTEMS

The system shall be designed, installed, documented and commissioned in accordance with UFC 3-600-01 and NFPA 13 requirements. Provide wet pipe automatic sprinkler protection to provide complete coverage throughout the facility. Provide the appropriate style and temperature rating of sprinklers as required by criteria.

For light hazard areas the sprinkler rate of application must be 4.1 L/min/m^2 (.1 gpm/ft^2), over an area of 21 m^2 (225 ft^2) with hose stream allowance of 950 L/min (250 gpm). For ordinary hazard areas the sprinkler rate of application must be 6.1 L/min/m^2 (.15 gpm/ft^2), over an area of 12.1 m^2 (130 ft^2) with hose stream allowance of 1900 L/min (500 gpm).

Provide quick-response concealed sprinklers with ordinary temperature rating in areas with finished ceilings.. Provide sprinkler cover plates to match ceiling color.

Provide corrosion resistant sprinklers for all exterior areas requiring sprinkler protection.

D4090 OTHER FIRE PROTECTION SYSTEMS

Provide a pre-engineered wet chemical fire extinguishing system for protection of cooking equipment including exhaust hoods, ducts, and related work.

-- End of Section --

6. ENGINEERING SYSTEMS REQUIREMENTS

D50 ELECTRICAL

SYSTEM DESCRIPTION

Provide an interior electrical system consisting of Service Entrance Wiring and Equipment, Distribution and Lighting Panelboards, Dry Type Transformers as required, Conduits, Feeder and Branch Circuits, Motor Control Equipment, Lighting and Branch Wiring, Communications and Alarm Systems, Emergency Lighting, Grounding and Lightning Protection as required, including accessories and devices as necessary and required for a complete and usable system. This section covers installations out to the building 1.5 meter (5 foot) line.

Provide each building with a single utility service with radial power distribution.

Select electrical characteristics of the power system to provide a safe, efficient and economical distribution of power based upon the size and types of electrical loads to be served. Use distribution and utilization voltages of the highest level that is practical for the load to be served.

Provide a minimum of 20 percent spare circuit and load capacity at all levels of the power distribution system including any stand-by power systems.

Provide an interior distribution system consisting of insulated conductors in conduit.

GENERAL SYSTEM REQUIREMENTS

Provide an Electrical System complete in place, tested and approved, as specified throughout this RFP, as needed for a complete, usable and proper installation. Install all equipment in accordance with the criteria of PTS Section D50 and the manufacturer's recommendations. Where the word "should" is used in the manufacturer's recommendations, substitute the word "must".

This section of the RFP includes all electrical work on or within the building out to the five (5) foot line. Electrical site work outside the five (5) foot line is covered in section G40.

SUSTAINABILITY
Provide electrical systems and components that support project sustainability and energy goals.

ANTITERRORISM
Provide bracing of electrical equipment which is suspended and weighs more than 31 pounds.

SEISMIC BRACING
Bracing of electrical equipment to resist seismic events is required based on site seismic design criteria and building importance factor.

ELECTRICAL TESTING
Test new electrical equipment in accordance with NETA acceptance testing specifications. Test existing electrical equipment remaining in service in accordance with NETA maintenance testing specifications.

COMMISSIONING
Commission all systems in accordance with RFP Part 3 Chapter 2; UFGS Section 01 33 29, *Sustainability Requirements and Reporting*, UFGS Section 01 91 00.15 20 *Total Building Commissioning*, and UFC 1-200-02 *High Performance and Sustainable Building Requirements*.

Refer to UFC 4-721-10, *Navy and Marine Corps Bachelor Housing* for additional Electrical Design criteria.

D5010 ELECTRICAL SERVICE AND DISTRIBUTION

D501001 MAIN TRANSFORMERS

Main transformer(s) are defined in Section G40, *Site Electrical Utilities*.

D501002 SERVICE ENTRANCE EQUIPMENT

Provide underground service into the facility.

Provide a main switchboard or main distribution panel as service equipment.

Provide energy usage monitoring by using digital metering with current transformers on the incoming service equipment. Monitor the total power usage at the service entrance. Monitored output must report to and be compatible with the Direct Digital Controls (DDC) system.

D501003 INTERIOR DISTRIBUTION TRANSFORMERS

Provide dry type transformers as required to step down secondary voltages for general purpose outlets and other low voltage equipment.

D501004 PANELBOARDS

Provide distribution and branch circuit panelboards to serve loads as required.

Panel boards shall have a main circuit breaker and shall not have more than 54 single-pole circuits.

Provide one spare conduit, minimum of ¾-inch (19 mm), for every three empty spaces

Provide a load center style panel board for each room unit. Locate panel board inside room unit.

Provide a minimum of 20% spare circuit and load capacity at all levels of the power distribution system. The interior distribution system shall consist of insulated conductors in conduit.

Provide electrical calculations and load analysis and electronic files with each submittal per UFC 3-501-01 Chapter 3 requirements.

Provide panel board schedules with panel circuit directories typed in to indicate the specific load and location.

D501005 ENCLOSED CIRCUIT BREAKERS

Provide enclosed circuit breakers where required. Circuit breakers shall be fully rated. Series rated are not acceptable.

D501006 MOTOR CONTROL CENTERS

Provide individual motor starters with disconnect switches, variable speed drives and manual motor starters for motor controls as required by mechanical equipment.

D501090 OTHER SERVICE AND DISTRIBUTION

Provide transient voltage surge protective devices (SPD) at the following locations: service entrance and panel boards supporting exterior and interior lighting circuits, and critical electronic equipment such as fire alarm, telephone and computer circuits.

Provide an interior distribution system consisting of insulated conductors in conduit to supply the required power to all lighting, convenience outlets, equipment connections and or special systems associated with the project. Provide connections for all equipment, plumbing systems, air conditioning and ventilation systems, fire alarm system, FF&E, Cable TV (CATV) systems, and security systems, and systems provided by other trades.

D5020 LIGHTING AND BRANCH WIRING

Provide electrical connections for all systems requiring electrical service.

Provide lighting and general purpose receptacles throughout all spaces as required.

Provide USB charging ports per FC 4-721-10N, section 3-14.2 Power.

Provide lighting and general purpose receptacles throughout all spaces and mounting height as required.

Provide recessed wall-mounted GFCI duplex receptacles in weatherproof covers (“in-use” type) around the perimeter of the building at 50 feet on center.

Provide Ground Fault Current Interrupter on all applicable areas to include but not limited to: Receptacles at Living Unit kitchenette area, within 6 feet of any sink, Janitor Closets, Restrooms, Laundry, Kitchen, Electrical Water Coolers, Elevator pits and Shower Rooms as required.

Provide dedicated circuits and connections for the following special outlets: see Chapter 5, "Room Requirements".

- Washer & Dryer Machines
- Vending Machines
- Printers
- Refrigerator
- Microwave

Provide inset receptacles for wall mounted TVs.

Coordinate with Furniture System electrical requirements where applicable in the open office areas.

Provide electrical connections for ceiling fans with sliding speed control switches at office spaces where air conditioning is not specified. Strategically locate and install the ceiling fans so that spinning blades will not cause the strobe effect from lights behind them.

Provide electrical connections for Fire Dampers and HVAC system in Telecommunication (T/C) rooms.

D502001 BRANCH WIRING

Provide branch wiring consisting of insulated conductors in conduit.

D502002 LIGHTING EQUIPMENT

Provide a complete lighting system consisting of exit and emergency lighting and area lighting consisting of LED, including switches and automatic controls including occupancy sensors, vacancy sensors, daylighting controls, automatic lighting shutoff systems and dimming systems. Lighting Fixtures and controls shall be in compliance with UFC 3-530-01 *Interior and Exterior Lighting systems and Controls* and ASHRAE 90.1 requirement.

Provide LED type building-mounted full cut-off type lighting fixtures along exterior, complete with lamps. All building exterior egress doors shall be provided with lighting fixtures.

Provide an automatic lighting control system for exterior lighting fixtures utilizing photocell switches such that lighting will automatically turn "ON" at dusk and turn "OFF" at dawn.

Utilize dual technology (infrared detector and motion) occupancy sensor to determine if individual berthing quarter is occupied. Provide override off switch.

D5030 COMMUNICATIONS AND SECURITY

The Room Requirements Section identifies locations for communications and security systems and equipment, unless noted otherwise in the following sub-elements.

D503001 TELECOMMUNICATIONS SYSTEMS

Provide a complete building entrance facility, backbone distribution system, and horizontal distribution system including, but not necessarily limited to, all wiring, pathway systems, grounding, backboards, connector blocks, protectors for all copper service entrance pairs, patch panels, fiber optic distribution panels, terminators for all fiber optic cables, outlet boxes, telephone jacks, data jacks and cover plates.

Provide infrastructure to support a wireless internet service for the base service-wide contracted provider; coordinate to provide ample equipment space to meet the needs of this service.

Provide Category 6 Unshielded Twisted Pair (UTP) copper cable for horizontal voice and data cables.

Provide commercial telephone jacks in the building as follows: two each on opposite walls of each room module in the living/sleeping area, one in the duty office, and one at the reception counter.

Provide commercial internet service jacks in the building as follows: two each on opposite walls of each room module in the living/sleeping area, one in the duty office, and two at the reception counter.

Provide NMCI service jacks in the building as follows: one in the duty office, one at the reception counter, and four in the multi-purpose room at various locations.

D503004 TELEVISION SYSTEMS

Provide a complete CATV system to be owned and maintained by the Government including all interior equipment required to provide high quality TV signals to all outlets with a return path for interactive television and cable modem access. System must include, but is not necessarily limited to, headend amplifier, amplifiers, splitters, combiners, line taps, cables, outlets, tilt compensators and all other parts, components, and equipment necessary to provide a complete and usable system.

Conduct CATV testing at each of the following points in the system: Furthest outlet from each telecommunications closet.

Provide commercial service jacks in the building as follows: two each on opposite walls of each room module in the living/sleeping area, one in the duty office, one at the reception counter, and four in the multi-purpose room at various location.

D503005 SECURITY SYSTEMS

An Electronic Security System (ESS) is the integrated electronic system that consists of the following subsystems; access control system (ACS) and closed circuit television (CCTV) systems for assessment of alarm conditions.

The ESS for this project must meet requirements of UFC 4-021-02, *Electronic Security Systems* and consist of an ACS and a CCTV system for alarm assessment. Refer to FC 4-721-10N *Navy and Marine Corps Unaccompanied Housing* for required CCTV locations.

CCTV is required at “all common areas such as hallways, lobbies, lounges, classrooms/special use rooms, common kitchens, game rooms, laundry rooms, vending areas, stairwells (interior and exterior), elevators, entrances and exits, building exterior and additional areas/facilities adjacent to the UH facility. Provide CCTV per FC 4-730-10N requirements.

Provide empty raceways with pull strings, outlet boxes, cover plates, and associated power outlets to enable system installation by the ESS supplier

D503090 OTHER COMMUNICATIONS AND ALARM SYSTEMS

Provide an Individual Inhabited Facility/Building Subsystem type Mass Notification System (MNS).

D5090 OTHER ELECTRICAL SERVICES

D509001 GENERAL CONSTRUCTION ITEMS (ELECTRICAL)

Provide General Construction Items (Electrical) including, but not necessarily limited to, all connections, fittings, boxes and associated equipment needed by this and other sections of this RFP as required for a complete and usable system.

Provide firestopping for conduits and cable trays that penetrate fire-rated walls, fire-rated partitions, or fire-rated floors in accordance with Section C10, Interior Construction.

D509002 EMERGENCY LIGHTING

Provide power and wiring for emergency lights and exit lights throughout the facility.

Provide power and wiring for emergency lights and LED type exit lights throughout the facility to illuminate the means of egress in accordance with UFC and NFPA 101 life safety for a minimum of 90-minutes

Emergency lighting in finished space, use battery supported emergency ballasts in conjunction with normal lighting fixtures for emergency lighting.

In non-finished spaces, use standalone emergency lighting units for emergency lighting.

Provide emergency lighting units with self-testing and diagnostic control features.

The UPS unit type equipment is provided by the Government to support selected equipment server racks. DB Contractor shall provide power connections to support these UPS units.

D509003 GROUNDING SYSTEMS

Provide a complete grounding system for the facility electrical and telecommunications systems.

Provide Communication grounding systems in accordance with UFC 3-501-01 *Electrical Engineering* and as defined in UFC 3-580-01 *Telecommunications Building Cabling Systems Planning and Design* and UFC 3-580-10 *Navy and Marine Corps Intranet (NMCI) Standard Construction Practices*.

D509004 LIGHTNING PROTECTION

Perform lightning risk assessment per NFPA 780. If risk assessment indicates a lightning protection system must be installed, design and install a complete lightning protection system in accordance with UFC 3-575-01, *Lightning and Static Electricity Protection System*, with a UL Lightning Protection Inspection Certificate certified to NFPA 780, including, but not necessarily limited to, strike termination devices, conductors, ground terminals, interconnecting conductors, surge protective devices, and other connectors and fittings required for a complete and usable system.

Work includes installation of a complete lightning protection system on roof such that the entire system meets the UL Lightning Protection Inspection Certificate certified to NFPA 780.

Lightning Protection Systems must not void the roof warranty.

D509006 ENERGY MANAGEMENT CONTROL SYSTEM

Provide cables, connection, and testing to the base Energy Management System.

Coordinate connection requirements with switchgear and pad mounted transformer kWh metering.

Provide power wiring and connections as required for all systems and equipment including mechanical equipment and DDC controls. Coordinate connections requirement with other disciplines.

--End of Section --

6. ENGINEERING SYSTEMS REQUIREMENTS

E10 EQUIPMENT

GENERAL SYSTEMS REQUIREMENTS
E1010 COMMERCIAL EQUIPMENT

All specialty equipment must be installed by qualified installers regularly engaged in installing the specialty equipment.

Provide energy using equipment in accordance with criteria listed in Part 2 UFGS Section 01 33 29, *Sustainability Requirements and Reporting*.

E101003 VENDING EQUIPMENT

Design the facility to provide space, utilities, and cooling to accommodate the following vending equipment;

a. (1) snack vending machines
b. (2) drink vending machines

The vending machines will be purchased and provided by others.

E102009 AUDIOVISUAL EQUIPMENT

Under the construction contract, the general contractor shall be responsible for coordinating design requirements with the end user/Command Information technology (IT) personnel, and provide Audiovisual (AV) equipment. Provide the services of an audiovisual equipment specialist to design the audiovisual equipment.

AV Equipment including electronics potentially connected to data/IT, must be coordinated with design and construction but planned for and funded by the user or Budget Submitting Office sponsoring the user. AV equipment must include, but is not limited to: intercom/sound systems, smartboards, flat screens, projectors, video teleconferencing, interactive wall systems and Closed-Circuit Televisions (CCTVs). **The AV equipment will be purchased and provided by others.**

E1040 GOVERNMENT FURNISHED EQUIPMENT

Rough-in and provide connections for Government-furnished equipment such that equipment will operate as intended, including providing miscellaneous items such as plugs, receptacles, wire, cable, conduit, flexible conduit and outlet boxes or fittings. Equipment will remain under the control of the Government until such time as the Contractor is ready to install. Provide 30 days advance notice of expected installation date. Audio visual equipment will be transferred to the site by others for installation by the construction contractor. Testing requirements of Government Furnished equipment is the responsibility of the Contractor and must follow the same guidelines as though the Contractor had provided the equipment. Install and test the following Government furnished items: Audio visual equipment.

6. ENGINEERING SYSTEMS REQUIREMENTS

E20 FURNISHINGS

SYSTEM DESCRIPTION

Fixed furnishings are part of the Structural Interior Design (SID). Design and documentation of the movable furnishings are part of the Furniture, Fixtures, and Equipment (FF&E) Package.

The design and documentation of both will be funded as part of the construction contract. The purchase and installation of the FF&E Package will be funded separately as part of Collateral Equipment.

The movable furniture and furnishings (FF&E) for this facility will be purchased and installed by others. For informational purposes only, the movable furniture and furnishings (FF&E) for this facility may include, but are not limited to movable furniture systems, freestanding furniture, area/accent rugs, artwork, appliances, flat screen TVs (not connected to data), accessories, shop equipment, specialty equipment (specified by the Activity) and other miscellaneous items to support facility functions.

Fixed furnishings (items that are fixed to the structure) are required in this contract. Fixed furnishings (items that are fixed to the structure), such as specialty equipment, drying cages, weapon racks, lockers, motorized projection screens, blinds/shades are part of the construction contract.

The Audiovisual (AV) Equipment will be provided by others. Refer to Part 3 Section E10 of this RFP.

GENERAL SYSTEMS REQUIREMENTS

Design and provide fixed furnishings for all areas as developed during Activity programming and as indicated in the Room Requirements (refer to Part 3 Chapter 5 of this RFP). Provide the services of an Interior Designer with a minimum of one of the following credentials: National Council for Interior Design Qualification (NCIDQ) certification, or state and/or jurisdiction Interior Design Certification, Registration, or License. This Interior Designer must prepare both the Strutural Interior Design (SID) and participate in all design charrettes and review meetings to develop the building design and floor plan. The Contractor's Interior Designer and any Specialists must not have any affiliation with the products specified. The NAVFAC Interior Designer reserves the right to approve/disapprove the qualifications of the Contractor's Interior Designer.

Closley coordinate all fixed and movable furnishings selections with Parts 3 and 4 Sections C10, Interior Construction, and C30 and E10 of this RFP. Consider furnishings relative to Part 2 UFGS Section 01 33 29, *Sustainability Requirements and Reporting* and UFC 1-200-02, *High Performance and Sustainable Building Requirements*.

INTERIOR DESIGN SUBMITTAL AND MEETING REQUIREMENTS

STRUCTURAL INTERIOR DESIGN (SID)

The SID submittal process must begin following the award of the RFP. The SID submittal includes Interior Design programming documents, Floor Plans, and exterior & interior finish/color and material sample boards. Refer to this RFP Part 4 Section Z10 *General Performance Technical Specifications* and Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*.

Provide the following SID meetings and submittals;

a. Concept Design Workshop (CDW) (10%-15%) or Initial Design Meeting: The Contractor's Interior Designer must meet with the Activity and IDD/Base Property for Marine Corps projects] to develop the Interior Design SID programming documents. The Contractor's Interior Designer will provide in-depth room by room interviews to confirm Activity requirements for the new facility(s). These interviews must occur at the Activity's current location, if possible, to include building walk-thru(s). Submit minutes of this meeting to the NAVFAC Interior Designer within 7 days

b. Design Development (35%-50%) Submittal: The Contractor's Interior Designer must provide a conceptual Finish Schedule, proposing finish materials to be used in all spaces.

c. SID "Over the Shoulder" Review: Prior to the Prefinal (100%) Submittal, the Contractor's Interior Designer must meet with the NAVFAC Interior Designer for an "over-the-shoulder" review meeting to present a minimum of (2) options for the interior building finishes/colors/materials. Finishes must display manufacturer's label/specifications and be presented in a "loose" format for preliminary approval prior to the presentation with the Activity. The over-the-shoulder review meeting is to be held at NAVFAC SW.

d. Prefinal (100%) Submittal: The Contractor's Interior Designer must present a minimum of two (2) NAVFAC-approved interior building finishes/color/material options, to the Activity for approval. Each of these two finish options must be documented and submitted in a 16"x20" presentation board format to the NAVFAC Project Manager. In addition, the submittal must include an updated Finish Schedule, Floor Finish Plan, and Finish Legend for review and approval.

e. Final Submittal: The Contractor's Interior Designer must incorporate the final approved Finish Schedule, Floor Finish Plan and Finish Legend into the Contractor's final drawing set. These drawings and all approved finishes must be submitted in 8-1/2" x 11" binder format, using heavy duty plastic sheet protectors. Three (3) sets of the Final SID Submittal must be distributed one each to the NAVFAC Project Manager, FEAD/ROICC, and the Activity.

STRUCTURAL INTERIOR DESIGN (SID) CONSTRUCTION SUBMITTALS

Substitutions to the SID finishes are not permitted once they have been approved by NAVFAC during the design phase. In the event that revisions are required due to unforeseen conditions such as discontinued product, such revisions must be submitted via the FEAD/ROICC for approval by the NAVFAC Interior Designer before substitutions can be made.

E2010 FIXED FURNISHINGS (SID)

Fixed furnishings (SID) are funded as part of the construction project and are not funded as part of FF&E. Each submittal must demonstrate complete coordination with the facility design and with the package for movable furnishings.

Develop design as described herein and provide storage shelving, equipment racks, and window treatments. Cross reference C10 Interior Construction, and C30 Interior Finishes, for performance requirements.

E201001 FIXED ARTWORK

As required, provide decorative feature walls and/or wall treatments, graphics and/or logo in appropriate locations such as the main reception/lobby areas to assist with the identification and branding. Select and incorporate mixed finishes, materials and colors. See C30.

E201002 WINDOW TREATMENTS

Provide window treatments per UFC 4-721-10, *Navy and Marine Corps Unaccompanied Housing*, Chapter 3; General Design Criteria.

Provide all windows and other glazed openings to the interior and exterior of the building with solar shading system manually operated double-roller sunscreen and room darkening shades and are considered SID and are funded as part of the construction project. Provide double-roller light/UV diffusing/solar darkening shades and black-out shades in all Living Rooms and where needed throughout. Solar shades must manufactured with extruded aluminum bead chain and roller mechanisms. Provide 3% - 5% openness.

Soft window treatments, such as draperies, are considered FF&E and will be provided by others, as required.

Where applicable the solar shading system must be inside mount. Surface or outside mount must be installed with a valance.

Reference Part 4 for further guidance.

E201003 FIXED SEATING AND TABLES

As required, but not limited to, provide fixed locker room benches, fixed tables and chairs, auditorium fixed seating.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

G10 SITE PREPARATION

SYSTEM DESCRIPTION

The site preparation activities consist of site clearing, demolition, salvage, relocation, earthwork, and hazardous waste remediation to ready the site for other work associated with the project.

GENERAL SYSTEM REQUIREMENTS

Develop the project site and perform off-site work necessary to meet the requirements of the project, antiterrorism criteria, local codes, reference standards, technical specifications and performance criteria.

Previous site plans of the existing site are being provided to the Contractor in lieu of a topographic survey. Perform a topographic survey of the project area that will be impacted by the work in accordance with FC 1-300-09N, *Navy and Marine Corps Design Procedures*. Include the topographic survey in all design submittals. The existence, size, and location of the utilities are not guaranteed by the provided site plans. Verify the location of all utilities prior to construction.

Unless otherwise noted, provide new facilities at the locations indicated on the drawings in Part 6.

Minimize the impact of construction activity on operations and neighboring facilities.

Identify and obtain permits to comply with federal, state, and local regulatory requirements associated with the work. Submit a complete Permits Record of Decision (PROD) form with the first design submittal package. Determine correct permit fees and pay said fees. Forward copies of permits, permit applications, and the completed PROD form to the Government's Civil Reviewer and Environmental Reviewer. Perform work in accordance with the obtained permits.

The project site does not include jurisdictional tidal and non-tidal wetlands.

Coordinate and obtain the Contracting Officer's approval for proposed haul route(s), work site access point(s), employee parking location(s) and material laydown and storage area(s).

Refer to Site Analysis and Building Requirements Sections for additional site preparation functional program information.

GOVERNMENT PROVIDED GEOTECHNICAL INFORMATION

Subsurface soil information, including a geotechnical report are included in Part 6.

The included subsurface information is only for the Contractor's information and is not guaranteed to fully represent all subsurface conditions. The Government will not be responsible for any interpretation or conclusion by the Contractor drawn from the data or information.

The included geotechnical report accompanying the subsurface information, such as boring logs or testing reports, is provided only to better convey data or to document observed site conditions. The assumptions, analysis, and recommendations of any accompanying report were developed for preliminary planning purposes only and may not reflect present project requirements. Retain a Geotechnical Engineer experienced and licensed in the geographic region of the project to interpret the Government provided information as related to the Contractor's own design concept and develop

geotechnical requirements to support design and construction.

Anticipate minor variations in subsurface conditions between borings. The Contractor is responsible for costs associated with the site preparation, ground improvement and foundations except as allowed by Contract Clause Federal Acquisition Regulation (FAR) 52.236-2, "Differing Site Conditions". The Contractor's Geotechnical Engineer must perform additional subsurface investigation/testing as required to adequately determine geotechnical factors including the type and capacity of the project foundations. The Contractor's Geotechnical Engineer is required to evaluate the provided information and any additional information obtained and prepare a report as described in other portions of this RFP. The minimum requirements for the subsurface investigation and report are as required by FC 1-300-09N with associated references.

Perform the soils investigation at the site for use in the design and construction of the new facilities. Perform, at Contractor's expense, subsurface exploration, investigation, testing, and analysisfor the design and construction of features such as the building foundations, pavement section(s), stormwater management facility(ies), and utility structure foundations. Prepare a report including laboratory analysis of samples and recommendations for foundation and pavement design by a Professional Engineer as specified and in accordance with UFC 3-201-01, *Civil Engineering.*

As a minimum, the successful bidder's Geotechnical Engineer must perform additional subsurface exploration and supplementary laboratory testing as necessary to support the design concept.

Provide personnel under the supervision of a registered Professional Engineer to inspect excavations and soil/groundwater conditions throughout construction. The Engineer is required to perform pre-construction and periodic site visits throughout construction to assess site conditions. The Engineer, with the concurrence of the Contractor and the Contracting Officer, is required to update the excavation, sheeting, shoring and dewatering plans as construction progresses to reflect actual site conditions and is required to submit the updated plan and a written report (with professional stamp) at least monthly informing the Contractor and Contracting Officer of the status of the plan and an accounting of Contractor adherence to the plan; specifically addressing any present or potential problems. The Engineer must be available to meet with the Contracting Officer at any time throughout the Contract duration. Provide the services of the Engineer at no additional cost to the Government. It is important to note that the presence of loose or compressible soils may result in excessive settlement that could impact the performance of surface bearing structures and supporting facilities such as foundations, slabs, pavements, sidewalks, and utilities. The magnitude and duration of consolidation settlement will be dependent on the composition, depth, and thickness of the compressible soils as well as the successful bidder's design concept. The Contractor's Geotechnical Engineer is responsible for evaluating potential global settlement due to designed grade increases and final structural loads. The Contractor's Geotechnical Engineer must develop any settlement mitigation procedures (such as preloading, surcharging, fill monitoring programs, and ground improvement systems) needed to maintain global settlements within tolerable limits. Surcharge material, if required, must remain in place for a minimum of 90 days.

G1010 SITE CLEARING

Install erosion and sediment control devices prior to beginning clearing or grubbing operations.

If approved by the Government clearing and grubbing may be allowed to accommodate construction equipment within the designated construction laydown area.

G101001 CLEARING

The project site does not have saleable timber.

Burning will not be permitted.

G101006 DEBRIS DISPOSAL

Contractor is not authorized to dispose of clearing and grubbing material in the Installation's sanitary landfill.

Waste materials will become the property of the Contractor; transport, dispose of or recycle waste materials in accordance with Part 2 Section 01 57 19, *Temporary Environmental Controls*.

G1020 SITE DEMOLITION & RELOCATIONS

There are no items to be salvaged, reused or relocated on the site.

G102002 ABOVEGROUND SITE DEMOLITION

Preserve the following aboveground site elements: Preserve existing parking spaces within the project site to the extent possible.

G102007 SITE CLEANUP

Waste materials will become the property of the Contractor; transport, dispose of or recycle waste materials in accordance with Part 2 Section 01 57 19, *Temporary Environmental Controls*.

G1030 SITE EARTHWORK

G103001 GRADING

Perform site grading in accordance with UFC 3-201-01, *Civil Engineering*. Provide finish floor elevations for new facilities and elevations for mechanical/electrical equipment pads in accordance with UFC 1-200-01, *DoD Building Code* and UFC 3-101-01, *Architecture*.

G103002 COMMON EXCAVATION

G103003 ROCK EXCAVATION

Blasting will not be permitted.

G103004 FILL & BORROW

Provide borrow and select fill from off-base sources.

G103004 1.1 REQUIREMENTS FOR OFF SITE SOIL

For each borrow site, provide borrow site testing for hazardous materials characteristics from a composite sample of material, collected in accordance with standard soil sampling techniques. Do not bring material onsite until tests results have been received and approved by the Contracting Officer.

G103005 COMPACTION

G103006 SOIL STABILIZATION

The following methods of soil stabilization will not be allowed: cement, lime slurry, asphalt, and pressure grouting.

G103007 SLOPE STABILIZATION

Provide slope stabilization through appropriate grading and site design for a minimum factor of safety of 1.5 or slope that does not exceed the maximum slope per local code requirements. The following techniques for slope stabilization will not be allowed: geogrids, gabions, riprap, or concrete.

G103010 TEMPORARY DEWATERING

G103011 TEMPORARY EROSION & SEDIMENT CONTROL

Obtain Erosion and Sediment Control permit required for the proposed work from the EPA Installation Environmental Stormwater Program Manager. Submit permit application to the Contracting Officer for approval prior to submitting to the EPA.

G1040 HAZARDOUS WASTE REMEDIATION

The project site does not require hazardous waste remediation.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

G20 SITE IMPROVEMENTS

SYSTEM DESCRIPTION

Provide site improvements that support project sustainability goals of & Part 2 UFGS Section 01 33 29, *Sustainability Requirements and Reporting*.

The site improvements consist of pavements and pavement related features, landscaping and other exterior site development work related to this project. Provide a pavement design by a licensed Professional Engineer familiar with conditions local to the project site. Site design, including but not limited to design of parking and pedestrian circulation, will include coordination with the Civil Engineer and the Landscape Architect.

GENERAL SYSTEMS REQUIREMENTS

Provide site improvements as required to make a useable facility that meets functional and operational requirements, incorporates all applicable anti-terrorism, force protection and physical security requirements and blends into the existing environment.

Provide accessibility in conformance with requirements of UFC 1-200-01 , *DoD Building Code (General Building Requirements).*

Identify and obtain permits to comply with federal, state, and local regulatory requirements associated with this work. Complete the Permits Record of Decision (PROD) form with the first design submittal package. Determine correct permit fees and pay said fees. Forward copies of permits, permit applications, and the completed PROD form to the Government's Civil Reviewer. Perform work in accordance with the obtained permits.

Minimize the impact of construction activity on operations and neighboring facilities.

Locate new site improvements at locations indicated on the drawings in another part of this RFP. If specific locations are not provided, site the improvements to develop appropriate and positive relationships with other facilities and to conform to existing development patterns.

Refer to Site Analysis and Building Requirements Sections for additional site improvement functional program information.

G2010 ROADWAYS

Provide roadways, as required, to allow for safe, convenient and logical circulation, while discouraging through traffic. Design pavements based on the anticipated daily traffic over the life of the project (25 years) as well as the existing soil conditions at the site.

Provide roadways of bituminous pavement or Portland cement concrete (PCC) pavement. Permeable pavement is not allowed. Aggregate pavement may not be used.

Provide new roadway and other pavement sections as required by soil conditions and determined by the Designer of Record. Design pavement sections in accordance with UFC 3-201-01 *Civil Engineering*.

Provide other roadway improvements including markings and signage.

G201001 BASES & SUBBASES

The following materials will not be allowed for base or subbase courses: bituminous concrete, lean concrete, cement stabilized, sand-clay, lime rock, shell, or reclaimed asphalt.]

G201002 CURBS & GUTTERS

Provide curb and gutter to tie into adjacent facilities.

G201003 PAVED SURFACES

Regardless of the calculated pavement section(s), the minimum flexible pavement section is two inches (51) of bituminous surface mix over eight inches (203) of aggregate base over a compacted subgrade. The minimum rigid pavement section is six inches (152) of PCC over four inches (102) of aggregate base over a compacted subgrade. Portland cement concrete must have a minimum design flexural strength of 650 psi (4.48 Mpa). Recycled asphalt pavement material may not be used for bituminous concrete pavement as permitted by the State Highway Specifications.

G201004 MARKING & SIGNAGE

Provide pavement markings including crosswalks.

Provide signage.

Provide temporary pavement markings and signage throughout construction to meet phasing requirements indicated in the project program. Provide temporary signage in accordance with the Manual on Uniform Traffic Control Devices (MUTCD).

G201005 GUARDRAILS & BARRIERS

Provide guardrails, wheelstops, and bollards in accordance with UFC 3-201-01, *Civil Engineering*.

G201090 OTHER ROADWAYS

G2020 PARKING LOTS

Existing parking lots will be used for resident, visitor, staff, and service personnel parking. If possible, preserve parking spaces within the BEQ project site or incorporate them into the new site design. Provide pedestrian access from the existing parking lot to the east of the project site to the building entrance.

Provide other parking improvements including: Provide secure, weather-protected bicycle Racks/Stalls/parking as necessary for 8 bicycles.

Provide handicapped parking in accordance with UFC 1-200-01 , *DoD Building Code (General Building Requirements)*.

G202001 BASES & SUBBASES

Crushed concrete meeting specified gradation for aggregate base or subbase courses may not be used.

G202002 CURBS & GUTTERS

Provide curb and gutter to tie into adjacent facilities.

G202003 PAVED SURFACES

Regardless of the calculated pavement section(s), the minimum flexible pavement section is two inches (51) of bituminous surface mix over eight inches (203) of aggregate base over a compacted subgrade. The minimum rigid pavement section is six inches (152) of PCC over four inches (102) of aggregate base over a compacted subgrade. Portland cement concrete must have a minimum design flexural strength of 650 psi (4.48 Mpa). Portland cement concrete must have a minimum design flexural strength of 4.48 to 4.83 MPa (650 to 700 psi) in not more than 28 days.

Recycled asphalt pavement material may not be used for bituminous. Concrete pavement (as permitted by the SHS).

G202004 MARKING & SIGNAGE

Provide pavement markings including crosswalks reflectorized pavement markings for paved roads, and fire access markings in accordance with marking criteria and procedures recognized by the Department of Transportation (DOT)

Provide signage that is unified with the installation's sign system. Use white die-cut sheet vinyl lettering in the Helvetica Medium font for all signage. Regulatory Signs shall conform to the United States Department of Transportation's Manual of Uniform Traffic Control Devices (MUTCD) and Standard Highway Signs and Markings (SHSM).

Provide temporary pavement markings and signage to meet phasing requirements indicated in the Project Program. Provide temporary signage in accordance with the MUTCD.

G202005 GUARDRAILS & BARRIERS

Provide guardrails, wheel stops, and bollards in accordance with UFC 3-201-01, *Civil Engineering*.

G2030 PEDESTRIAN PAVING

Provide a network of Portland cement concrete (PCC) and/or permeable interlocking concrete pavers sidewalks, separated from, but connected to vehicular circulation systems, to allow for pedestrian circulation between various new and existing elements of the project. Interface new pedestrian circulation systems with existing pedestrian circulation systems and include input from the Civil Engineer, Architect, and Landscape Architect.

G203006 OTHER WALKS, STEPS & TERRACES

Provide concrete sidewalks to convey all pedestrian traffic expected in conjunction with this project. Connect all sidewalks associated with this project into those of adjacent facilities. Ensure that exterior sidewalks have non-slip surfaces and drain away from the building.

G2040 SITE DEVELOPMENT

G204001 FENCING & GATES

No perimeter fencing is required.

G204003 EXTERIOR FURNISHINGS

Site furnishings are required to conform to the Base Exterior Architectural Plan (BEAP) and the Installation Appearance Plan (IAP). Provide picnic tables, trash receptacles, benches, barbecues, and recycling receptacles. At a minimum, provide a trash and ash receptacle at the designated smoking area.

Design picnic areas that includes cook-out grills, benches, tables, trash receptacles, hot ash receptacles, and paved areas for barbecue activities.

G204005 SIGNAGE

Provide signage in accordance with the Activity's BEAP and the Installation Appearance Plan.

G204007 PLAYING FIELDS

Provide horseshoe pits.

G204090 OTHER SITE IMPROVEMENTS

Provide a covered picnic area designed to accommodate up to twelve persons.

Provide dumpster pad and enclosure. Enclosure shall be concrete masonry unit to match the new BEQ. Provide double metal gate with self-closing mechanism.

Equipment Wash-down Area:

Provide an equipment wash-down area located adjacent to the building entry point. The area must be concrete, 2.44 meters in diameter with a centrally supported standpipe consisting of six shower heads with cut-off valves suitable for simultaneous operation of all six shower heads. Provide a properly sized, freeze-proof stand-pipe with easily accessible shut-off valves. Concrete area must be sloped to a central drain. All equipment must be suitable for outside service.

Equipment Drying Area

Provide an enclosed equipment drying area on concrete hard-stand adjacent to the equipment wash-down area. Each drying area must be totally enclosed on all four sides and across the top with 9 gauge chain link fence fabric. Fence fabric must be adequately supported by fence posts and horizontal support members. The horizontal support members must be appropriately sized to support a hanging equipment load of 732 Kg per meter.

G2050 LANDSCAPING

Provide complete landscaping as required to provide a quality, cost-effective, functional and visually appealing landscape program that will enhance the development, while complying with anti-terrorism, force protection and physical security requirements. Design the landscape to reinforce the facility entry and complement existing landscapes in the vicinity. Provide a 5' wide (1.5 m) (minimum) inorganic rock cobble mulch setback (no vegetation) around the building.

Guarantee landscaping for a period of one year. Provide a one year Establishment and Maintenance period. Landscaping Guarantee and Establishment and Maintenance periods must commence on

the date that the inspection by the Contracting Officer shows that all landscaping under this contract has been satisfactorily installed.

Provide complete landscaping maintenance, including but not limited to, routine lawn mowing, edging, pruning, pest inspection/treatment, re-mulching of mulch products, watering, weeding, fertilizing, and restaking, throughout the guarantee period.

Provide mechanical equipment screening wall on three sides of new equipment.

Provide shrubs or small growing trees for screening of mechanical equipment/walls, dumpster enclosures, and other obstructions that do not present an aesthetic view from the street.

G205002 EROSION CONTROL MEASURES

Prevent erosion from occurring by providing erosion control measures as required by city, state and federal requirements.

G205003 TOPSOIL AND PLANTING BEDS

Provide a planting soil mixture composed of 100 percent topsoil around root balls of shrubs, trees, groundcovers, perennials, and ornamental grasses that is at a minimum, twice as wide and equally as deep as the plant's root balls.

G205004 SEEDING SPRIGGING AND SODDING

Sod areas indicated to be turfed. Restore existing turf areas disturbed by Contractor operations that are to remain as turf areas. Restore by means of sodding and provide same guarantee and maintenance as for new landscape areas.

G205005 PLANTINGS

Preserve existing trees to the greatest extent possible; trees may be transplanted within the site. Select plant material from Master Plant Lists found within the Installation Appearance Plan (IAP). Other plants not found on these lists may be used if approved by the reviewing Government Landscape Architect. Final approval of new plant materials rests with the reviewing Government Landscape Architect.

If used for stormwater management, provide bioretention filters, plants, plant quantities, and soil mix in accordance with the State's Best Management Practices (BMP) Design Manual.

G205007 IRRIGATION SYSTEMS

Provide a water conserving, highly efficient, automatic, below-grade irrigation system to irrigate landscaped areas with plantings. Use non-potable water sources whenever possible. Do not irrigate inorganic mulch beds that have no plants. Irrigate trees in separate zones from other plants. Irrigate turf in separate zones from other plants. Do not utilize drip irrigation on this project.

Valve the irrigation system in accordance with exposure and plant evapotranspiration (ET) requirements. If applicable, irrigation controller must be compatible with existing central irrigation control system. Provide meters for irrigation systems using potable water. Meter the irrigation system as close to main as possible and provide downstream irrigation backflow assembly.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

G30 SITE CIVIL/MECHANICAL UTILITIES

SYSTEM DESCRIPTION

The site civil/mechanical utility systems include water supply systems, sanitary sewer systems, storm drainage systems, heating distribution systems, cooling distribution systems, fuel distribution systems and associated appurtenances which are more than 5 feet (1.5 meters) outside the building.

The site mechanical utility system consists of piping and appurtenances for natural gas ncluding accessories and devices as required for a complete and usable system up to 5 feet (1.5 meters) outside buildings.

GENERAL SYSTEM REQUIREMENTS

Develop the site to provide water, fire protection, sanitary sewer, storm drainage, heating, cooling and fuel distribution services that meet the requirements of each regulatory agency that governs and issues permits for the construction and operation of these systems. Site design is required to comply with UFC 3-210-10, *Low Impact Development*, as well as state or local stormwater management regulations and project sustainability goals.

Provide each system complete and ready for operation.

Physically verify the location of existing above and below ground utilities prior to starting work.

Identify and obtain permits to comply with all federal, state, and local regulatory requirements associated with this work. Complete the Permits Record of Decision (PROD) form with the first design submittal package. Determine correct permit fees and pay said fees. Forward copies of permits, permit applications, and the completed PROD form to the Government's Civil/Mechanical Reviewer. Perform work in accordance with the obtained permits.

Minimize the impact of construction activity on facility operations and neighboring facilities.

Existing utility connection points are indicated on the drawings in Part 6. Obtain final approvals from the Government's Civil/Mechanical Reviewer and the Contracting Officer for utility connection points associated with this work.

Disciplines involved in site work design must coordinate utility locations with the Civil Engineer and the Landscape Architect.

Refer to Site Analysis and Building Requirements Sections for additional site civil/mechanical utilities information.

Provide fittings, connections and accessories required for a complete and usable system. Install equipment in accordance with PTS Section G30 and the manufacturer's recommendations. Where the word "should" is used in the manufacturer's recommendations, substitute the word "must".

See UFGS 01 78 23 OPERATION AND MAINTENANCE DATA for additional requirements.

Provide site civil/mechanical utility systems and components that support project sustainability goals of Part 2 UFGS Section 01 33 29, *Sustainability Requirements and Reporting*.

Leakage test is not required.

G3010 WATER SUPPLY

The new water system is an extension of the existing water system. The existing water system serving the project site is owned by the Federal Government. Provide the new water system and connections to the existing water system in accordance with the utility provider's requirements, and UFC 3-230-01 *Water Storage, Distribution, and Transmission*; whichever is more stringent.

Notify the utility provider of the additional demand generated by the proposed facility. Provide a copy of all correspondence with the utility provider to the Government's Civil/Mechanical Reviewer.

Provide connection to the existing water distribution system at the point indicated on the drawings in Part 6.

Design the new water system so that water consumption is measured at a minimum, by one meter for each facility. Ensure the meter is easily accessible, but not obvious.

G301002 POTABLE WATER DISTRIBUTION

Connect the new potable water distribution system to the distribution system at the point indicated on the drawings in Part 6.

A water meter on each proposed service line is required. Provide type of meter and remote reading as required by the utility provider. Water meter must be compatible with and monitored by the Direct Digital Controls (DDC) system.

Provide meter box.

Backflow preventers are required on service entrance lines. If not specified in ESR D20 and D40, provide reduced pressure backflow preventers aboveground outside the building.

G3020 SANITARY SEWER

The new sanitary sewer system is an extension of the existing sanitary sewer collection system. The existing sanitary sewer collection system serving the project site is owned by the Federal Government. Provide the new sanitary sewer system and connections to the existing sanitary sewer collection system in accordance with state sewerage regulations, the utility provider's requirements, and UFC 3-240-01 *Wastewater Collection*; whichever is more stringent.

Notify the utility provider of the additional wastewater flow generated by the proposed facility. Provide a copy of all correspondence with the utility provider to the Government Civil Reviewer.

Provide connection to the existing sanitary sewer collection system at the point indicated on the drawings in Part 6 of this RFP.

G302002 SANITARY SEWER MANHOLES & CLEANOUTS

Provide precast concrete manholes only.

G3030 STORM SEWER

The new storm sewer system is an extension of the existing storm sewer system. The existing storm

sewer system serving the project site is owned by the Federal Government. Provide the new storm sewer system and connections to the existing storm sewer system in accordance with the utility provider's requirements, UFC 3-201-01 *Civil Engineering*; UFC 3-210-10 *Low Impact Development* and *FC 1-300-09N Navy and Marine Corps Design Procedures*, state stormwater management laws and regulations, local stormwater management laws and regulations and project sustainability goals; whichever is more stringent.

Provide connection to the existing storm sewer collection system at the point indicated on the drawings Part 6 of this RFP.

G303001 STORM SEWER PIPING

The following materials for storm sewer piping will be allowed: PVC, ductile iron, reinforced concrete pipe, corrugated steel or HDPE.

G303003 LIFT STATIONS

Stormwater pump stations are not allowed.

G303004 CULVERTS

The following materials for culvert piping will be allowed: reinforced concrete pipe or corrugated steel.

G303007 STORM WATER MANAGEMENT

Provide stormwater management that complies with state stormwater regulations, UFC 3-201-01 *Civil Engineering*, UFC 3-210-10 *Low Impact Development*, FC 1-300-09N *Navy and Marine Corps Design Procedures*; whichever is more stringent. Provide Low Impact Development (LID) features in accordance with UFC 3-210-10 *Low Impact Development*. The following LID features may be used: bioretention, filter/buffer strips, grassed swales, bioretention swales, wet swales, rain barrels, cisterns, infiltration trenches, permeable pavement or pavers, and tree box filters.

For Navy and Marine Corps projects, use FC 1-300-09N *Navy and Marine Corps Design Procedures* to comply with Navy LID Policy (commonly referred to as the Penn Memo). Navy LID policy sets a goal of no net increase in stormwater and sediment or nutrient loading from major renovation projects and construction projects. Major renovation projects are defined as having a storm water component and exceeding $5 million and major construction projects are defined as exceeding $750,000. If LID is not implemented to the Maximum Extent Technically Feasible (METF), as defined in UFC 3-210-10, a waiver request must be approved by the Regional Engineer. Coordinate waiver review and approval with the Civil Technical Discipline Coordinator (TDC).

Projects with a footprint exceeding 5,000 SF or exceeding the dollar values above must be documented on the NAVFAC Low Impact Development (LID) Data Card and submitted to the Government's Civil Engineer for review and approval.

The NAVFAC Low Impact Development (LID) Waiver Form and Low Impact Development (LID) Data Card can be found at: http://www.wbdg.org/references/pa_dod_sust_contract.php .

The Contractor must obtain State Stormwater Management and regulatory permits required for the proposed work from the Installation Environmental Stormwater Program Manager. Coordinate reports, submittals, and permit applications through the Contracting Officer.

G3060 FUEL DISTRIBUTION

G306006 GAS DISTRIBUTION PIPING NATURAL GAS

The Contractor shall provide connection to the existing gas distribution system shown on the Project Site plan included in Part 6. The actual point of connection will depend on the specific design. Contractor will verify the point of connection with the utility provider.

A natural gas meter on each proposed service line is required. Provide type of meter and remote reading with a transducer and a totalizer as required by the Public Works Office. The meter shall be both manual and remote read capable, compatible with the Johnson Control System. They shall also be linked to the EMS system.

Provide polyethylene (PE) or steel natural gas piping system.

G306090 OTHER FUEL DISTRIBUTION

Provide warning and identification tape for underground utilities.

-- End of Section --

6. ENGINEERING SYSTEMS REQUIREMENTS

G40 SITE ELECTRICAL UTILITIES

SYSTEM DESCRIPTION

The site electrical utility system consists of all power and telecommunications and fiber optic cabling from the existing distribution system point of connection including all connections, accessories and devices as necessary and required for a complete and usable system. This section covers installations up to within 5 feet (1.5 meters) of new (or existing) building location.

GENERAL SYSTEM REQUIREMENTS

Provide an Electrical System complete in place, tested and approved, as specified throughout this RFP, as needed for a complete, usable and proper installation. Install all equipment in accordance with PTS Section G40 and the manufacturer's recommendations. Where the word "should" is used in the manufacturer's recommendations, substitute the word "must".

Provide site electrical utilities systems and components that support project sustainability goals of Part 2 UFGS Section 01 33 29, *Sustainability Requirements and Reporting*.

G4010 ELECTRICAL DISTRIBUTION

Connect to the existing 12 kV, three phase, three wire, 60 Hertz electrical power system. The connection point must be overhead at Pole 5-12L (refer to Attachment A in Part 6) and extended to the project site underground in ductbank to a Pad Mounted Transformer.

The available fault current at the point of connection must be assumed to be an infinite bus.

G401002 TRANSFORMERS

Provide a three phase pad mounted transformer to feed the facility.

Provide the following features:

- Dead-Front Design with ANSI specific front plate spacing
- Radial feed switch
- Three surge arresters for radial feed circuits.
- Biodegradable less-flammable liquid-insulated

G401005 TOWERS, POLES, CROSSARMS AND INSULATORS

Provide wood poles for overhead power distribution.

G401006 UNDERGROUND ELECTRIC CONDUCTORS

Provide medium voltage 15 kV single conductor copper Type MV-105, No-Lead Ethylene Propylene Rubber (NL-EPR) 133% insulation level, extruded semi-conducting cross-linked copolymer insulation shield, copper tape shield, Chlorinated Polyethylene (CPE) jacket.

Provide a medium voltage and a 600 volt secondary underground electrical power distribution systems to meet the connection requirements as indicated in paragraph G4010 "Electrical Distribution". Provide fused cut-outs on connections to overhead distribution systems.

G401007 DUCTBANKS, MANHOLES, HANDHOLES AND RACEWAYS

Provide a system of concrete encased ductbanks, handholes and manholes for all underground power wiring. Hand holes are only to be utilized for low voltage power cables and branch circuits. Provide spare conduits per UFC 3-550-01 requirements.

G401008 GROUNDING SYSTEMS

Provide a complete grounding system for the electrical power distribution system.

G401009 METERING

Provide a separate Kilowatt Demand Meter for each Pad Mounted Transformer.

G4020 SITE LIGHTING

Provide site lighting for exterior including underground distribution, handholes, grounding, poles, fixtures and controls as required for a complete and usable system.

The pedestrian pathways between the buildings, recreational areas will consist of 12’ pedestrian pole mounted LED luminaires. The recreational courts will consist of 20’ pole mounted, single and double, LED luminaires

G402001 EXTERIOR LIGHTING FIXTURES AND CONTROLS

Area and Parking Lighting for the facility.

Provide LED type lighting fixtures, complete with lamps.

Provide an automatic lighting control system for exterior lighting fixtures utilizing lighting contactors, time switches, and photocell switches such that lighting will automatically turn "ON" at dusk and turn "OFF" at dawn.

G402003 OTHER AREA LIGHTING

Provide other area lighting for equipment washdown and drying areas and recreational areas.

G402004 LIGHTING POLES

Provide aluminum poles complete with foundations for site lighting.

G402005 UNDERGROUND ELECTRIC CONDUCTORS

Provide a complete underground distribution system for all site lighting systems.

G402006 DUCTBANKS, MANHOLES AND HANDHOLES

Provide a direct buried underground system including conduits and handholes to meet the connection requirements indicated in paragraph G4020 "Site Lighting".

G402007 GROUNDING SYSTEMS

Provide a complete grounding system for all site lighting systems.

G4030 SITE COMMUNICATION AND SECURITY

Provide a site communication system including, but not necessarily limited to, Voice and Data Telecommunications Systems and Cable Television (CATV) Systems including all conduit and wiring, underground structures, termination equipment, poles and structures, and grounding systems as required for a complete and usable system.

G403001 TELECOMMUNICATIONS SYSTEMS

The connection point for the site telecommunications systems must be underground at Manhole MH-2 (refer to Attachment A in Part 6) and extended to the project site underground in a system of manholes and ductbank to the telecommunications equipment room.

Provide 50 pair copper and 24 strand single mode fiber optic cable between the connection point and building entrance facilities.

Provide 1 empty 4 inch (103 mm) conduits with pull strings between the exterior connection point and equipment room. Contractor will provide copper and fiber optic cable into the building entrance facilities.

G403002 CABLE TV SYSTEMS (CATV)

The connection point for the site CATV must be overhead at Pole 5-13L (refer to Attachment A in Part 6) and extended to the project site underground in ductbank to the telecommunications equipment room.

Provide 1 empty 4 inch (103 mm) conduits with pull strings between the exterior connection point and equipment room.

G403003 CABLES AND WIRING

Cables and wiring for site telecommunications systems are required as stated in their respective categories.

G403004 DUCTBANKS, MANHOLES AND HANDHOLES

Provide a system of ductbanks, manholes, and handholes for site telecommunications.

G403009 GROUNDING SYSTEMS

Provide a complete grounding system for all site communications and security systems.

-- End of Section --

Naval Facilities Engineering Systems Command

NAVFAC Southwest

RFP N62473-23-R-1012
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BACHELOR ENLISTED QUARTERS
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PART 4

Performance Technical Specifications

SECTION A10

FOUNDATIONS
12/18

A10 GENERAL

RFP Part 3 including the Engineering System Requirements (ESR) provide project specific requirements. The RFP Part 4, Performance Technical Sections (PTS) provide generalized technical requirements that apply to multiple facility types and include more requirements than are applicable to any one project. Therefore, only the RFP Part 4 requirements that apply to the project and further define the RFP Part 3 project specific requirements are required.

A10 1.1 DESIGN GUIDANCE

Provide the design and installation in accordance with the following references. This Performance Technical Specification (PTS) adds clarification to the fundamental requirements contained in the following Government Standards. The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification*.

A10 1.1.1 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements).(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed there, which includes the following significant UFC(s):UFC 3-101-01, ArchitectureUFC 3-220-01, Geotechnical EngineeringUFC 3-301-01, Structural Engineering

UNIFIED FACILITIES GUIDE SPECIFICATIONS (UFGS)

UFGS Section 31 23 00.00Excavation and Fill
20

A10 1.2 GENERAL REQUIREMENTS

A10 1.2.1 Earthwork

Prepare the following UFGS Specification as part of the project specification and include the prepared specification section in the design submittal for the project:

UFGS Section 31 23 00.00 20 *Excavation and Fill*

A10 1.2.2 Geotechnical Report

A10 1.2.2.1 Subsurface Soils Information

Any provided subsurface soil information is included for the Contractor's information only, and is not guaranteed to fully represent all subsurface conditions. The data included in this RFP is to assist in proposal preparation. Perform such subsurface exploration, investigation, testing, and analysis for the design and construction of the foundation system at no additional cost to the Government.

A10 1.2.2.2 Contractor-provided Geotechnical Engineer

Retain a Geotechnical Engineer experienced and licensed in the geographic region of the project to interpret any provided data as related to the design concept and develop requirements for bidding. Requirements stated in Parts 3 and 4 of the RFP take precedence over any content of any included geotechnical report. Additional requirements for the geotechnical design of this project are provided elsewhere in this RFP.

Coordinate all work by the Contractor-provided Geotechnical Engineer with the Contracting Officer and ensure that work does not conflict with Base operations. When providing the Foundation Work Design submittal, provide the Contractor's Geotechnical Report (an Adobe Acrobat PDF version on CD and two printed copies) for review and record keeping purposes. The report becomes the property of the Government. Provide the Geotechnical reports generated during construction, such as pile load tests or PDA results, pile driving results and analysis, to the Contracting Officer (an Adobe Acrobat PDF version and two printed copies) for record keeping purposes.

A10 1.2.2.3 Contractor-Provided Geotechnical Report

Submit a written Geotechnical report based upon Government-provided subsurface investigation data and all additional field and laboratory testing accomplished at the discretion of the Contractor's Geotechnical Engineer. The Geotechnical Report must include all requirements listed in UFC 3-220-01, *Geotechnical Engineering*, paragraph entitled "Section 1803 "Geotechnical Investigations"; in addition, include the following:

a. The project site description, vicinity map and site map indicating the location of borings and any other sampling locations. Provide 24 hour groundwater observations for at least 20% of the borings, minimum one boring. Provide notes explaining any abbreviations or symbols used and describing any special site preparation requirements.
b. Results of all applicable field and laboratory testing, whether Government or Contractor-provided. Address existing subsurface conditions, selection and design of

the foundation and floor slab, all underground construction including utility installation and all other site-specific requirements (such as soil stabilization and slope stability).

c. Engineering analysis, discussion and recommendations addressing:

1) Settlement analysis. Settlement must be limited as required in EM 1110-1-1904, *Settlement Analysis*

2) Bearing Capacity Analysis.

3) Foundation selection and construction considerations (shallow, deep, special); dimensions, and installation procedures.

4) Site preparation (earthwork procedures and equipment), compaction requirements, building slab preparation (as applicable), soil sensitivity to weather and equipment, groundwater influence on construction, mitigation of expansive soils or liquefaction potential, dewatering requirements, slope stability, and other necessary instructions.

5) Sheeting and shoring considerations, as applicable

6) Pavement design calculations with parameters defined, actual or assumed, and recommended thicknesses and materials, whether for design or for proposed modifications to the RFP provided pavement design

7) Haul routes and stockpile locations for earthwork, as applicable.

8) Calculations to support conclusions and recommendations.

9) Present recommendations on a structure-by-structure Basis.

Provide the Geotechnical Report signed by the Contractor-provided Geotechnical Engineer.

Submit report accompanied by a cover letter identifying any report recommendations of the report proposed to be adopted into the design which are interpreted by the Contractor as a change condition to the Geotechnical or Pavement related requirements of the RFP.

A10 1.2.2.4 Geotechnical Site Data required in Design Drawings

The Contractor's final design drawings must include the Government-provided subsurface data presented in the RFP as noted below, as well as all additional borings and laboratory test data results performed by the Contractor. The data provided must include:

a. Logs of Borings and related summary of laboratory test results and groundwater observations. Provide 24-hour groundwater observations for at least 20% of the borings, minimum one boring. Provide notes explaining any abbreviations or symbols used and describing any special site preparation requirements.
b. Indicate locations of all borings on the drawings. Revise applicable design drawings to reference the Contractor's Geotechnical Report as being a basis for design.

A10 1.3 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Provide verification of satisfactory construction and system performance of the foundations via Performance Verification Testing, and by field inspection, as detailed in this section of the RFP and in Part 2 Section 01 45 00.05 20, *Design and Construction Quality Control*. Provide special tests and special inspections in accordance with Part 2 Section 01 45 00.05 20.

A10 1.3.1 Earthwork

Perform quality assurance for earthwork in accordance with International Building Code (IBC) Chapter 17 and UFGS Section 31 23 00.00 20. A competent person, as defined by COE EM 385-1-1, under supervision of a registered Professional Engineer is required to provide inspection of excavations and soil/groundwater conditions throughout construction. The Engineer must perform periodic site visits throughout construction to assess site conditions. The Engineer, with the concurrence of the Contractor and the Contracting Officer, must update the excavation, sheeting, shoring, and dewatering plans as construction progresses to reflect actual site conditions and submit the updated plan and a written report (with professional stamp) at least monthly informing the Contractor and the Contracting Officer of the status of the plan and an accounting of Contractor adherence to the plan; specifically addressing any present or potential problems. The Engineer must be available to meet with the Contracting Officer at any time throughout the contract duration. The Contractor will bear all costs of the Engineer.

A10 1.3.2 Piles

If piles are required, perform quality assurance for pile construction in accordance with UFC 1-200-01, *DoD Building Code (General Building Requirements)*. Pile installation procedures and installed piles must be inspected and found to be in compliance with these specifications prior to acceptance of the work.

Provide test piles as directed by the Contractor's Geotechnical Engineer.

Perform pile load tests, if required, in accordance with UFC 1-200-01.

Submit results of the pile test program and final pile installation criteria to the Contractor prior to installation of the production piles.

If deemed necessary by the Contractor's Geotechnical Engineer, use the dynamic wave equation method of analysis, pile driver analyzer, to validate pile and pile hammer compatibility, establish pile driving criteria, establish terminal penetration resistance, or verify as-driven capacity of the pile.

Perform PDA or static pile load test (American Society for Testing and Materials - ASTM D 1143) for piles with an allowable design capacity equal to or greater than 40 tons. When required, perform PDA on all indicator or test piles. Perform CAPWAP analysis on at least one test (indicator) pile to determine capacity with a minimum three-day set-up and develop pile installation criteria.

A10 1.4 DESIGN SUBMITTALS

Provide design submittals in accordance with Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, Facilities Criteria (FC) 1-300-09N, *Navy and Marine CorpsDesign Procedures,*UFC 3-220-01, *Geotechnical Engineering, and* UFC 1-200-01, *DoD Building Code (General Building Requirements)*.

UFGS sections listed below or in the body of the PTS text are to be used by the Designer of Record (DOR) as a part of the design submittal. The DOR must edit these referenced UFGS sections and submit them as a part of the design submittal specification. Edit the specification sections in accordance with the limitations stated in PTS Section Z10, *General Performance Technical Specifications*.

UFGS Section 31 23 00.00 20 *Excavation and Fill*

A10 1.5 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*. In addition to the Z10 requirements, the Designer of Record (DOR) must approve the following submittals as a minimum:

All structural elements necessary for construction

Contractor-provided geotechnical report

Controlled fill or backfill material tests

Test pile and production pile installation records

Pile load testing reports

As-Built drawings - Include a statement on the drawings indicating the method used to verify the allowable design capacity of the piles (load tests or PDA).

A1010 STANDARD FOUNDATIONS

A1010 1.1 SHEETING AND SHORING

Provide sheeting and shoring as required. Provides sheeting and shoring

plans signed by the Contractor's Geotechnical Engineer.

A1010 1.2 TERMITE CONTROL

A1010 1.2.1 Termite Control Barrier System

Formulate and apply termiticide in accordance with the manufacturer's label directions. Provide termiticide with a label bearing evidence of registration by the U.S. Environmental Protection Agency or appropriate requirements of the host country.

Apply termiticide to the soil that will be covered by or lie immediately adjacent to the building(s) and structure(s), providing a protective barrier against subterranean termites.

Maintain the Pest Management Maintenance Record, DD Form 1532-1 and submit the Pest Management Report, DD Form 1532 as required.

Provide applicator(s) that are licensed or certified by the Federal government or the state or the host country, as applicable.

A1010 1.2.2 Warranty

Provide a 3-year written warranty against infestations or reinfestation by subterranean termites of the buildings or building additions constructed under this contract. Perform annual inspections of the building(s) or building addition(s). If live subterranean termite infestation or subterranean termite damage is discovered during the warranty period, and building conditions have not been altered in the interim:

a. Perform treatment as necessary for elimination of subterranean termite infestation;
b. Repair damage caused by termite infestation;
c. Reinspect the building approximately 180 calendar days after the repair.

A1010 1.2.3 Visual Inspection Guide

To maintain resistance to termites, complete the system and do not disturb, penetrate or damage during the remaining contract time period. Provide Manufacturer’s Guidance for performing a visual assessment of the installed system to ensure the system provides the designed termite physical barrier.

A101001 WALL FOUNDATIONS

Provide foundation walls as required in accordance with the requirements of this section and other portions of this RFP.

A101002 COLUMN FOUNDATIONS AND PILE CAPS

Provide column foundations or pile caps and grade beams as required in accordance with the requirements of this section and other portions of this RFP.

A1020 SPECIAL FOUNDATIONS

A102001 PILE FOUNDATIONS

Where piles are required, design, install, and test piles (including sheet piles, as applicable) in accordance with UFC 1-200-01, except as noted otherwise. Provide piles in accordance with the requirements of the Contractor's Geotechnical Engineer, and the following paragraphs.

A102001 1.1 DRIVING EQUIPMENT

Provide piles (including sheet piles, as applicable) to the required tip elevation and capacity with the appropriate equipment as recommended by the Contractor's Geotechnical Engineer. Provide pile hammer(s) of sufficient weight and energy to suitably install piles without damage.

Drive production piles with the same hammer, cap block, and cushion materials, and using the same operating conditions as test piles, including pre-augering and spudding.

A102001 1.2 INSTALLATION TOLERANCES

Locate the center of pile butts not more than four horizontal inches from the location indicated at cutoff elevation. Manipulation of the piles is not permitted. In addition to the stated tolerances, provide a minimum clear distance of five inches between the heads of piles and the edges of pile caps.

Locate top of sheet piles at cutoff elevation within 1/2 inch horizontally and 2 inches vertical of the location indicated. Manipulation of the piles is not permitted.

A variation of not more than 2 percent from the vertical for plumb piles, or not more than 4 percent from the required angle for batter piles will be permitted.

A102001 1.3 MISLOCATED AND DAMAGED PILES

Remove and replace with new piles those piles that are damaged, mislocated, or installed out of alignment tolerance or provide additional piles, installed as directed by the Contractor's Geotechnical /Structural Engineer and approved by the Contracting Officer, at no additional cost to the Government.

A102001 1.4 PILE SPACING

For cast-in-place concrete or augercast piles, provide adequate distance, as determined by the Contractor's Geotechnical/Structural Engineer, between freshly placed concrete and other pile installation operations to avoid damage to concrete.

A102001 1.5 COATED PILES

Handle treated or coated piles so as to protect the treatment or the coating. Repair damage or defects to treatment or coating.

A102002 CAISSONS

If required, provide caissons as required in accordance with the requirements of this section and other portions of this RFP.

A102003 UNDERPINNING

If required, underpin existing construction as required in accordance with the requirements of this section and other portions of this RFP.

A102004 DEWATERING

Dewater site for foundation construction as required by soil conditions and local subsurface and surface water, including rainfall, and considering any potential adverse impact on adjacent facilities, including settlement. Dewatering requirements and methods must be established by the Contractor's Geotechnical Engineer, based on his subsurface exploration and investigation.

A102005 RAFT FOUNDATIONS

If required, provide a raft foundation as required to achieve the requirements of this section and other portions of this RFP and as required by the Contractor's Geotechnical Engineer.

A102006 PRESSURE INJECTED GROUTING

If required, pressure inject grout as required to achieve the requirements of this section and other portions of this RFP and as required by the Contractor's Geotechnical Engineer.

A1030 GROUND FLOOR SLABS

A103001 STANDARD SLAB ON GROUND

If allowed by site conditions and recommended by the Contractor-provided Geotechnical Engineer, provide standard concrete slab on grade to meet the required loading requirement in accordance with the requirements of this section and other portions of this RFP.

Design and construct floor slab on grade in accordance with EM 1110-1-1904, Settlement Analysis, and so that any settlement of the floor slab will not result in harmful distortion of the floor, nor vertical misalignment of the floor with other building components (such as doorways and trenches), building utilities or with pile-supported building elements. If these above conditions cannot be met, provide a pile supported slab.

A103002 PILE SUPPORTED SLAB

Provide a pile supported floor slab if the conditions in the above paragraph cannot be met

A103003 TRENCHES

Provide reinforced concrete trenches with water proof joints and seals to prevent ground water infiltration.

A103004 PITS AND BASES

Provide reinforced concrete pits and bases with water proof joints and seals to prevent ground water infiltration.

A103005 FOUNDATION DRAINAGE

A103005 1.1 PERIMETER FOUNDATION DRAINAGE

Provide a perimeter drainage system shall be provided to remove water away from the foundation of the facility and to be deposited in the storm sewerage system of the site. Provide perforated pipe for the foundation drainage system of the type specified, and of a size sufficient to remove water from the foundation successfully. Provide one, or a combination of more than one, of the following types of pipe:

a. Corrugated Polyethylene (PE) Drainage Pipe: ASTM F 405, heavy duty, for pipe 3 to 6 inches in diameter inclusive; ASTM F 667 for pipe 8 to 24 inches in diameter. Fittings must be manufacturer's standard type and must conform to the indicated specifications.
b. Acrylonitrile-Butadiene-Styrene (ABS) Pipe: ASTM D 2751, with a maximum SDR of 35.
c. Polyvinyl Chloride (PVC) Pipe: ASTM F 758, Type PS 46, ASTM D 3034, or ASTM F 949 with a minimum pipe stiffness of 46 psi.

Installation includes wrapping the pipe with filter fabric sock and careful bedding of the pipe with appropriate fill material to ensure that the pipe does not become obstructed with the bedding material.

A103090 OTHER SLAB ON GROUND

A103090 1.1 BLOCK OR BOARD PERIMETER INSULATION

Provide only thermal insulating materials recommended by manufacturer for perimeter insulation. Provide one of the board or block thermal insulations listed below conforming to the following standards:

a. Extruded Preformed Cellular Polystyrene: ASTM C 578

Provide insulation to meet requirements of UFC 3-101-01, *Architecture*.

-- End of Section --

SECTION A20

BASEMENT CONSTRUCTION
12/18

A20 GENERAL

RFP Part 3 including the Engineering System Requirements (ESR) provide project specific requirements. The RFP Part 4, Performance Technical Sections (PTS) provide generalized technical requirements that apply to multiple facility types and include more requirements than are applicable to any one project. Therefore, only the RFP Part 4 requirements that apply to the project and further define the RFP Part 3 project specific requirements are required.

A20 1.1 DESIGN GUIDANCE

Provide the design and installation in accordance with the following references. This Performance Technical Specification (PTS) adds clarification to the fundamental requirements contained in the following Government Standards. The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification*.

A20 1.1.1 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s):UFC 3-101-01, ArchitectureUFC 3-220-01, Geotechnical EngineeringUFC 3-301-01, Structural Engineering)

UNIFIED FACILITIES GUIDE SPECIFICATIONS (UFGS)

UFGS Section 31 23 00.00 20	Excavation and Fill

A20 1.2 GENERAL REQUIREMENTS

A20 1.2.1 Required Specifications

The Designer of Record shall utilize the following UFGS Specifications for the project specification.

Section 31 23 00.00 20, *Excavation and Fill*

A20 1.2.2 Geotechnical Report

A20 1.2.2.1 Contractor-provided Geotechnical Engineer

The Contractor-provided Geotechnical Engineer is required to be experienced with soil conditions in the region where the project site is located. The geotechnical engineer must evaluate the RFP data, obtain and evaluate all additional data as required to support the design and construction, and prepare a Geotechnical Report.

A20 1.2.2.2 Subsurface Soils Information

Subsurface soil information, if provided, is included for the Contractor's information only, and is not guaranteed to fully represent all subsurface conditions. The data included in this RFP are intended for proposal preparation and preliminary design only. Perform subsurface exploration, investigation, testing, and analysis for the design and construction of the foundation system at no additional cost to the Government.

Coordinate all work by the Contractor-provided Geotechnical Engineer with the Contracting Officer and ensure that work does not conflict with Base operations. Prior to the Foundation Work Design submittal, provide a Contractor Geotechnical Report (an editable Adobe Acrobat PDF version on CD and two printed copies) for review and record keeping purposes. The report becomes the property of the Government. Provide the Geotechnical reports generated during construction, such as pile driving results and analysis to the Contracting Officer. In addition, provide an editable Adobe Acrobat PDF version and two printed copies for record keeping purposes.

A20 1.2.2.3 Contractor-Provided Geotechnical Report

Submit a written Geotechnical report based upon Government-provided subsurface investigation data and all additional field and laboratory testing accomplished at the discretion of the Contractor's Geotechnical Engineer. The Geotechnical Report must include all requirements listed in UFC 3-220-01, *Geotechnical Engineering*, paragraph entitled "Section 1803 Geotechnical Investigations"; in addition include the following:

a. The project site description, vicinity map and site map.
b. Results of all the field and laboratory testing, whether Government or Contractor-provided.
c. Engineering analysis, discussion and recommendations addressing:
d. Settlement
e. Bearing Capacity
f. Foundation selection and construction considerations (shallow, deep, special); dimensions, and installation procedures.
g. Site preparation (earthwork procedures and equipment),

compaction requirements, building slab preparation (as applicable), soil sensitivity to weather and equipment, and groundwater influence on construction

h. Sheeting and shoring considerations, as applicable
i. Pavement design parameters, actual or assumed, including recommended thicknesses and materials, be for design or for proposed modifications to the RFP provided pavement design only
j. Haul routes and stockpile locations for earthwork, as applicable
k. Calculations to support conclusions and recommendations
l. Present recommendations on a structure-by-structure basis

Provide the Geotechnical Report signed by a registered Geotechnical Engineer.

Submit the report accompanied by a cover letter identifying any recommendations of the report proposed to be adopted into the design which are interpreted by the Contractor as either conflicting with or being modifications to the Geotechnical or Pavement related requirements of the RFP.

A20 1.2.2.4 Geotechnical Site Data required in Design Drawings

The Contractor's final design drawings must include the Government-provided subsurface data presented in the RFP as noted below, as well as any additional borings and laboratory test result data performed by the Contractor.

a. Logs of Borings and related summary of laboratory test results and groundwater observations.
b. Indicate locations of all borings on the drawings. Revise the applicable design drawings to reference the Contractor’s Geotechnical Report as being a basis for design.

A20 1.3 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Provide verification of satisfactory construction and system performance via Performance Verification Testing, as detailed in this section of the RFP. Provide special tests and special inspections in accordance with Part 2 Section 01 45 00.05 20, *Design and Construction Quality Control*.

A20 1.3.1 Earthwork

Perform quality assurance for earthwork in accordance with International Building Code (IBC) Chapter 17 and UFGS Section 31 23 00.00 20. If a registered Professional Engineer is required to provide inspection of excavations and soil/groundwater conditions throughout construction, the Engineer must perform pre-construction and periodic site visits throughout construction to assess site conditions. The Engineer, with the concurrence of the Contractor and the Contracting Officer, must update the excavation, sheeting, shoring, and dewatering plans as construction progresses to reflect actual site conditions and must submit the updated plan and a written

report (with professional stamp) at least monthly informing the Contractor and the Contracting Officer of the status of the plan and an accounting of Contractor adherence to the plan; specifically addressing any present or potential problems. The Engineer must be available to meet with the Contracting Officer at any time throughout the contract duration. Provide the services of the Engineer at no additional cost to the Government.

A20 1.4 DESIGN SUBMITTALS

Provide design submittals shall be in accordance with PTS Section Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, Facilities (FC) 1-300-09N, *Navy and Marine CorpsDesign Procedures*, UFC 3-301-01, *Structural Engineering*, and UFC 3-220-01, *Geotechnical Engineering*.

In addition, UFGS sections listed below or in the body of the PTS text are to be used by the Designer of Record (DOR) as a part of the design submittal. If the UFGS products or systems are applicable to the project, the DOR must edit these referenced UFGS sections and submit them as a part of the design submittal specification. Edit the specification sections in accordance with the limitations stated in PTS section Z10, *General Performance Technical Specifications*.

UFGS 31 23 00.00 20, *Excavation and Fill*

A20 1.5 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*. In addition to the Z10 requirements, the Designer of Record (DOR) must approve the following submittals as a minimum:

Contractor-provided geotechnical report

Controlled fill or backfill material tests

All structural elements necessary for construction

A2010 BASEMENT EXCAVATION

A201001 EXCAVATION FOR BASEMENTS

Excavate for the basement as required in accordance with the requirements of this section and other portions of this RFP.

A201002 STRUCTURE BACKFILL AND COMPACTION

Provide backfill and soil compaction as required in accordance with the requirements of this section and other portions of this RFP.

A201003 SHORING

Provide shoring and sheeting as required in accordance with the requirements of

this section and other portions of this RFP. Provide shoring and sheeting plans signed by the Contractor's Geotechnical/Structural Engineer.

A2020 BASEMENT WALLS

A202001 BASEMENT WALL CONSTRUCTION

Provide basement walls as required in accordance with the requirements of this section and other portions of this RFP.

A202002 MOISTURE PROTECTION

A202002 1.1 BUILT-UP BITUMINOUS WATERPROOFING

A202002 1.1.1 Environmental Conditions

Apply the primers and waterproofing specified herein when the ambient temperature is above 40 degrees F.

A202002 1.1.2 Liquid Asphalt

Deliver bulk liquid asphalt in fully insulated, heated transport tanker vehicles with circulating pump devices. Maintain the temperature of the liquid asphalt between 400 and 450 degrees F during storage, provided the transport and storage time does not exceed 12 hours. If the transport and storage time exceeds 12 hours, lower the temperature to between 300 and 325 degrees F at the time the 12 hours are exceeded. Use liquid asphalt within 36 hours after loading in the transport tanker.

A202002 1.1.3 Materials

a. Bitumen - Asphalt; American Society for Testing and Materials (ASTM) D 449, Type I.
b. Bituminous Plastic Cement - ASTM D 4586, Type I for asphalt.
c. Membrane Fabric

The following requirements apply:

Felt or Fabric Material	Saturant or Impregnant	Specification
Glass (felt) mat	Asphalt	ASTM D 2178, Type III
Reinforcing glass fabric	Asphalt	ASTM D 1668, Type I

d. Nails - Galvanized roofing nails.
e. Primer - ASTM D 41 for asphalt.
f. Protection Board - ASTM D 517, plain, asphalt plank; ASTM C 208, construction grade building board, 1/2 inch thick, asphalt saturated or coated; ASTM C 726, 7/16 inch thick, covered on one side with waterproof paper or asphalt-saturated felt.

A202002 1.2 ELASTOMERIC SHEET WATERPROOFING

A202002 1.2.1 Environmental Conditions

Do not apply waterproofing during inclement weather or when there is ice, frost, surface moisture, or visible dampness on the surface to receive waterproofing and when ambient and surface temperatures are 40 degrees F or below. The restriction on the application of waterproofing materials when ambient and surface temperatures are below 40 degrees F will be waived if the Contractor devises a means, approved by the Contracting Officer, of maintaining the surface and ambient temperatures above 40 degrees F.

A202002 1.2.2 Butyl Rubber Sheeting

Not less than 60 mils minimum thickness.

A202002 1.2.2.1 Butyl Rubber Sheeting Performance Requirements

a. Thickness Tolerance, ASTM D 412: Plus or minus 10 percent;
b. Specific Gravity, ASTM D 297: 1.20, plus or minus 0.05;
c. Tensile Strength, ASTM D 412: 1200 psi minimum;
d. Tensile Stress at 300 percent elongation, ASTM D 412: 600 psi minimum;
e. Elongation, ASTM D 412: 300 percent minimum;
f. Tear Resistance, Die C, ASTM D 624: 125 pound force per inch (lbf/inch) minimum;
g. Shore A Hardness, ASTM D 2240: Five-second interval before reading; 60 plus or minus 10;
h. Ozone Resistance, ASTM D 1149: No cracks, 7 days - 50 pphm - 100 degrees F, 20 percent elongation;
i. Heating Aging-Accelerated, ASTM D 573: Tensile retention, 60 percent of minimum original elongation retention; 60 percent of minimum original requirement; 7 days, 240 degrees F.
j. Butyl Identification, ASTM D 471, Tricresyl Phosphate Immersion: Maximum volume swell 10 percent, 70 hrs, 212 degrees F;
k. Low Temperature Flexibility, ASTM D 746: No failure at -40 degrees F;
l. Water Absorption, ASTM D 471: +1 percent maximum. 7 days, 158 degrees F;
m. Exposure to Fungi and Bacteria in Soil, Minimum 16 Weeks: Unaffected; and
n. Water Vapor Transmission, 80 Degrees F Permeance, ASTM E 96, Procedure B or BW: 0.15 perms maximum.

A202002 1.2.2.2 Adhesive, Cement, and Tape for Use with Butyl Rubber

Provide as recommended by the butyl rubber waterproofing membrane manufacturer.

A202002 1.2.3 Composite, Self-Adhering Membrane Sheeting

Cold applied composite sheet consisting of rubberized asphalt and cross laminated, high-density polyethylene film. Not less than 60 mils minimum thickness is required.

A202002 1.2.3.1 Composite, Self-Adhering Sheeting Performance Requirements

a. Tensile Strength, ASTM D 412, Die C: 250 psi minimum;
b. Ultimate Elongation, ASTM D 412, Die C: 200 percent minimum;
c. Water Vapor Transmission, ASTM E 96 80 Degrees F Permeance, Procedure B: 0.1 perm maximum;
d. Pliability Degrees F, ASTM D 146: (180 Degrees Bend Over One Inch Mandrel): No cracks at minus -25 degrees F;
e. Cycling Over Crack at Minus 15 Degrees F: Membrane is applied and rolled across two primed concrete blocks with no separation between blocks. Crack opened and closed from zero to 1/4 inch. No effect at 100 cycles;
f. Puncture Resistance, ASTM E 154: 40 lb. minimum;
g. Lap Adhesion at Minimum Application Temperature, ASTM D1876 Modified, 5 lbs/in.(880 N/m);
h. Peel Strength, ASTM D 903: Modified, 9 lbs/in;
i. Resistance to Hydrostatic Head, ASTM D 5385: 231 ft of water
j. Water Absorption, ASTM D 570; 0.1% maximum.

A202002 1.2.3.2 Primer

Asphalt composition, ASTM D 41, or synthetic polymer in solvent as recommended by the membrane manufacturer.

A202002 1.2.3.3 Mastic

Polymer modified asphalt in suitable solvent of trowel-grade consistency and as recommended by the membrane manufacturer.

A202002 1.2.4 Protection Board

Three-dimensional, high impact resistant polymeric grid with woven monofilament drainage fabric bonded to the grid.

A202003 BASEMENT WALL INSULATION

A202003 1.1 BLOCK OR BOARD INSULATION

Provide only thermal insulating materials recommended by manufacturer for the indicated application. Provide one of the board or block thermal insulations listed below conforming to the following standards:

a. Cellular Glass: ASTM C 552
b. Extruded Preformed Cellular Polystyrene: ASTM C 578
c. Unfaced Preformed Rigid Polyurethane and Polyisocyanurate Board: ASTM C 591
d. Faced Rigid Cellular Polyisocyanurate and Polyurethane Insulation: ASTM C 1289
e. Type I Aluminum Foil on both major surfaces. Class 1 - Non-reinforced core foam.

A202003 1.2 BLANKET INSULATION

ASTM C 665, Type I, blankets without membrane coverings; with a thermal resistance value, which will be sufficient to meet the applicable building code and energy budget for the facility. The insulation material must not contain asbestos materials.

A202003 1.2.1 Recycled Materials

Provide Thermal Insulation containing recycled materials to the extent practicable, provided the material meets all other requirements of this section. The minimum required recycled materials content by weight are:

Rock Wool: 75 percent slag

Fiberglass: 20 to 25 percent glass cullet

A202004 INTERIOR SKIN

Comply with Section C30, *Interior Finishes*.

-- End of Section --

SECTION B10

SUPERSTRUCTURE
12/18

B10 GENERAL

RFP Part 3 including the Engineering System Requirements (ESR) provide project specific requirements. The RFP Part 4, Performance Technical Sections (PTS) provide generalized technical requirements that apply to multiple facility types and include more requirements than are applicable to any one project. Therefore, only the RFP Part 4 requirements that apply to the project and further define the RFP Part 3 project specific requirements are required.

B10 1.1 DESIGN GUIDANCE

Provide the design and installation in accordance with the following references. This Performance Technical Specification (PTS) adds clarification to the fundamental requirements contained in the following Government Standards. The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification*.

B10 1.1.1 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s):UFC 3-101-01, ArchitectureUFC 3-301-01, Structural Engineering)
UFC 4-023-03	Design of Buildings to Resist Progressive Collapse

B10 1.2 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Verify satisfactory construction and system performance via Performance Verification Testing, as detailed in this section of the RFP. The DOR must determine which and how many test are required for the project design from the appropriate UFGS sections. These DOR determined tests are in addition to the IBC chapter 17 required tests. The cost of all testing is included in the Contract.

B10 1.3 DESIGN SUBMITTALS

Provide design submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, Facilities Criteria (FC) 1-300-09N, *Navy and Marine CorpsDesign Procedures*, UFC 3-101-01, *Architecture*, and UFC 3-301-01, *Structural Engineering*.

B10 1.4 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*. In addition to the Z10 requirements, the Designer of Record (DOR) must approve the following submittals as a minimum:

All structural elements necessary for construction of the superstructure.

B1010 FLOOR CONSTRUCTION

B101001 STRUCTURAL FRAME

Structural frame elements may include columns, girders, beams, trusses, joists, moment frames, shear walls, and bracing. See Section B20, *Exterior Enclosure*, for additional requirements for exterior walls used as load-bearing walls or shear walls.

B101002 STRUCTURAL INTERIOR WALLS

Provide structural interior walls as required in accordance with the requirements of this section and other portions of this RFP. See Section C10, *Interior Construction*, for additional requirements.

B101003 FLOOR DECKS AND SLABS

If required, provide floor decks as required in accordance with the requirements of this section and other portions of this RFP.

B101006 RAMPS

Provide ramps as required in accordance with the requirements of this section and other portions of this RFP.

B101007 FLOOR RACEWAY SYSTEMS

See Section D50, *Electrical*, for floor raceway systems.

B1020 ROOF CONSTRUCTION

B102001 STRUCTURAL FRAME

Structural frame elements may include columns, girders, beams, trusses, joists, moment frames, shear walls, and bracing. See Section B20, *Exterior Enclosure*, for additional requirements for exterior walls used as load-bearing walls or shear walls.

B102002 STRUCTURAL INTERIOR WALLS

Provide structural interior walls as required in accordance with the requirements of this section and other portions of this RFP. See Section C10, *Interior Construction*, for additional requirements.

B102003 ROOF DECKS AND SLABS

Provide roof deck as required in accordance with the requirements of this section and other portions of this RFP.

B102004 CANOPIES

Provide canopies as required in accordance with the requirements of this section and other portions of this RFP.

-- End of Section --

SECTION B20

EXTERIOR ENCLOSURE
09/22

B203006 BLAST RESISTANT DOORS

Provide blast resistant doors as required by Part 3 of the RFP in accordance with UFC 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings*.

B20 GENERAL

RFP Part 3 including the Engineering System Requirements (ESR) provide project specific requirements. The RFP Part 4, Performance Technical Sections (PTS) provide generalized technical requirements that apply to multiple facility types and include more requirements than are applicable to any one project. Therefore, only the RFP Part 4 requirements that apply to the project and further define the RFP Part 3 project specific requirements are required.

B20 1.1 DESIGN GUIDANCE

Provide the design and installation in accordance with the following references. This Performance Technical Specification (PTS) adds clarification to the fundamental requirements contained in the following Government Standards. The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification*.

Industry standards, codes, and Government standards referenced in the section text that are not found in the Unified Master Reference List (UMRL) in the Federal Facility Criteria (FFC) at the Whole Building Design Guide (WBDG) website, are listed below for basic designation identification. Comply with the required and advisory portions of the current edition of the referenced standard at the time of contract award.

B20 1.1.1 Industry Standards and Codes

NATIONAL LUMBER GRADES AUTHORITY (NLGA)

B20 1.1.2 Government Standards

Military Handbook 1013/1A, *Design Guidance for Physical Security of Facilities*

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s): UFC 3-101-01, Architecture)
UFC 1-200-02	High Performance and Sustainable Building Requirements

B20 1.2 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Provide verification of satisfactory exterior enclosure system performance via Performance Verification Testing, and by field inspection as detailed in this section of the RFP. Provide special tests and special inspections in accordance with Part 2 Section 01 45 00.05 20, *Design and Construction Quality Control*. The cost of all testing is included in the Contract.

B20 1.2.1 Required Brick Masonry Testing and Field Samples

a. Where field testing is required, determine masonry strength in accordance with American Concrete Institute (ACI) 530.1.

b. Field Samples: Masonry Panel Requirements - At the job site submit for approval by the Designer of Record, a sample masonry panel minimum 8 feet (2.4 meters) long by a minimum of 4 feet (1.2 meters) high. Actual Sample size will be determined by number of components in the sample wall but provide a span of at least 4 feet (1.2 meters) of uninterrupted brickwork and 2 feet (.6 meters) above wall openings. The approved sample must exhibit the standard for workmanship and materials for the project. The sample panel must include brick coursing, bond, weep holes, flashing, thickness, anchors, joint reinforcing, wall ties, rigid-board insulation, intersection of walls, bond beams, expansion and control joints, and tooling of joints, range of color, texture of masonry, and mortar color; or cold-formed steel framing, insulation, fiberglass-faced gypsum sheathing, air barrier, moisture barrier/vapor retarders, exterior enclosure barrier connections to adjoining construction, sealing of exterior enclosure barrier penetrations, sealant, masonry ties and anchors, and tooling of joints, the range of color and texture of brick veneer, and the color of mortar. Protect the sample panel from damage at the site until masonry work is complete and approved, at which time the panel must be removed from the site. If there are windows or curtain walls in the project which interface with the masonry, a cut-away sample window or curtain wall mock-up must be installed in the masonry field panel, with all accessories, finishes, and trim (see B20 1.2.4 and 1.2.5). Masonry work must match the approved sample.

B20 1.2.2 Air Barrier Field Sample

Designate a portion of the project that reveals the various edge, seam, transition, and penetration conditions that the air barrier is exposed to. Determine this location with the Contracting Officer and obtain approval of the sealing methods employed on the project from the air barrier Manufacturer. Leave sample area exposed to view as long as practical to serve as a construction standard and comparison of future air barrier construction on the project. Before construction covers the sample area, provide detailed photographs of the air barrier details for future reference.

B20 1.2.3 Air Barrier Performance

Provide air barrier inspection on all projects and air barrier performance testing when required in RFP Part 3, Section B20.

B20 1.2.3.1 Air Barrier Inspection

Coordinate all subcontractors that provide part of the air barrier construction to provide an air tight barrier. Review the air barrier prior to being covered by subsequent construction to confirm that the air barrier complies with the following requirements;

a. Prior to applying an air barrier, confirm that the substrate complies with conditions required by the applied air barrier material manufacturer.
b. Air barrier must create a continuous barrier, without gaps, "fish mouths", holes, unsealed seams, or unsealed penetrations.
c. Air barrier components are compatible and capable of being permanently connected to form an air tight barrier.
d. Construction of the air barrier complies with air barrier design as indicated in the Basis of Design and exterior enclosure barrier drawings.
e. Air barrier is installed in accordance with manufacturer's standard details available on the Air Barrier Association of America (ABAA) website named "Air Barrier Materials, Components, Assemblies & Systems" and found at the following web link; http://www.airbarrier.org/materials/assemblies_e.php

B20 1.2.4 Thermal Envelope Performance Testing (Infrared Thermography)

Where required in RFP Part 3 or B20 1.2.3.2 *Air Barrier Performance Testing*, provide infrared thermal testing and repair as follows (coordinate with air barrier testing):

a. Test the building envelope using Infrared Thermography technology. Complete thermography testing in accordance with the requirements of ASTM C1060 and ISO 6781. The Contracting Officer will witness the testing. Testing must occur just before the building air tightness test. Testing must also occur during the air tightness test so that areas of building air leaks are detected. If the building air tightness test is failed, repeat thermographic testing just before and during subsequent air tightness tests until the air tightness test is successful.
b. Thermography Test Procedures: Submit detailed test procedures indicating the test apparatus, the test methods and procedures, and the analysis methods to be employed not later than 60 days after Notice to Proceed.
c. Thermography Test Report: Provide a report. The report must include thermographs in color and a color temperature scale to define the temperature indicated by the various colors. The report must identify the high temperature reading, the outdoor air temperature, the building indoor air temperature, and the wind speed and direction. The report must note any areas of compromise in the building envelope, and must note all actions

required and taken to correct those areas.

d. Final Test: Final thermography test report must demonstrate the problem areas have been corrected. Submit the complete test and analysis for review and approval.

B20 1.2.5 Air Barrier Performance Testing

Provide air barrier testing and repair as follows (coordinate with infrared thermal testing):

a. Provide a testing plan as a part of the Commissioning Plan and notify the Contracting Officer 7 working days before the testing will take place. 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.

   Also coordinate building access during the test with the Contracting Officer. Perform pretest inspection with all parties involved in the test and possible repairs of the building enclosure. Record pretest conditions and utilize pictures to assist in the documentation.

b. Designer of Record (DOR) must utilize UFGS Section 07 05 23, *Pressure Testing an Air Barrier System for Air Tightness,*and Contractor must perform testing as described in that specification. Where conflicts exist between the UFGS Section 07 05 23 and this performance specification, UFGS Section 07 05 23 will govern. The air leak flow rate must not exceed 0.25 CFM at 75 Pa per square foot (0.076 cmm 75 Pa per square meter) of building enclosure area including roof or ceiling, walls and floor as provided by the DOR.

   Method 1: This test consists of measuring the flow rates required to establish 12 positive and 12 negative building pressures from at least 25 Pa to at least 50 Pa. Take at least 12 bias pressure readings across the building enclosure averaged over 5 seconds each before and after the test. None of these readings must exceed 30% of the minimum test pressure.

   Method 2: this test consists of measuring the flow rates required to establish 12 positive building pressures from at least 50 Pa to at least 75 Pa. Take at least 12 bias pressure readings across the building enclosure averaged over 5 seconds each before and after the test. None of these readings must exceed 20% of the minimum test pressure.

   The test results must be either pass or fail. Provide the theoretical size of the opening that leaks the same amount as the building enclosure at 75 Pa, to facilitate the search for leaks and repair of the exterior enclosure.

c. Provide infrared thermography to determine air leakage paths if facility fails to retain the required air pressure in the test above. Utilize infrared cameras with a resolution of 0.1 degree C or better.

   Perform infrared thermography in accordance with ISO 6781:1983

and American Society for Testing and Materials (ASTM) C1060 and B20 1.2.4 *Thermal Envelope Performance Testing (Infrared Thermography)*. Determine air leakage pathways in accordance with ASTM E1186-03 *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.

Modify construction to stop identified air leakage until target is reached. Correct air path leaks at the source of the leak, do not use sealant to close air leakage paths that are required to be opened for maintenance of the facility such as fixtures, switches covers, receptacle covers, access doors, etc.

d. Seal air leaks in the following order of priority:

1. Top of the building. These include attics, roof/wall intersections, penthouse doors and walls, HVAC equipment.
2. Bottom of the building. These include ground floor access doors and inspection hatches, exhaust and air intake vents, service penetrations of enclosure, crawl spaces.
3. Vertical shafts. These include gasket stairwell fire doors, fire hose cabinets and recessed toilet accessories connected to vertical shaft, vertical and horizontal utility penetrations in service rooms, elevator rooms and shafts.
4. Exterior walls. These include weather strip doors and windows, exhaust fans and ducts, service penetrations, electrical receptacles, wall base.

B20 1.2.6 Required Records for Concrete Wall Panels

a. Cast-in-place - Submit to DOR mandatory batch ticket information as ASTM C 94 for each load of ready-mixed concrete.
b. Submit to DOR commercial testing results in accordance with PCI MNL-117 and as required in paragraph entitled "Sampling and Testing for Precast"

B20 1.2.7 Precast Concrete Wall Panel Surface Finish Sample

Submit to DOR a concrete wall panel sample 12 inches (300 mm) by 12 inches (300 mm) by approximately 1 1/2 inches (38 mm) in thickness, to illustrate quality, color, and texture of both exposed-to-view surface finish and finish of panel surfaces that will be concealed by other construction. Obtain initial approval of color and texture from DOR prior to submission of sample panels.

B20 1.2.7.1 Manufacturing Plant Sampling And Testing for Precast

Plant Quality Control - PCI MNL-117 for PCI enrolled plants. Where panels are manufactured by specialists in plants not currently enrolled in the PCI "Quality Control Program," provide a product quality control system in accordance with PCI MNL-117 and perform concrete and aggregate quality control testing using an approved, independent commercial testing laboratory. Submit test results to the Contracting Officer.

a. Aggregate Tests: ASTM C 33. Perform one test for each

aggregate size, including determination of the specific gravity.

b. Strength Tests: ASTM C 172. Provide ASTM C 39 and ASTM C 31/C 31M compression tests. Perform ASTM C 143 slump tests. Mold six cylinders each day or for every 20 cubic yards (15 cubic meters) of concrete placed, whichever is greater. Perform strength tests using two cylinders at 7 days and two at 28 days. Cure four cylinders in the same manner as the panels and place at the point where the poorest curing conditions are offered. Moist cure two cylinders and test at 28 days.

c. Changes in Proportions: If, the compressive strength falls below that specified, adjust the mix proportions and water content and make necessary changes in the temperature, moisture, and curing procedures to secure the specified strength. Notify the Contracting Officer of all changes.

d. Strength Test Results: Evaluate compression test results at 28 days in accordance with ACI 214 using a coefficient of variation of 20 percent. Evaluate the strength of concrete by averaging the test results (two specimens) of standard cylinders tested at 28 days. Not more than 20 percent of the individual tests must have an average compressive strength less than the specified ultimate compressive strength.

B20 1.2.7.2 Acceptable Appearance

Refer to *Architectural Precast Concrete*by the Prestressed Concrete Institute, in the "Acceptability of Appearance" paragraph for reasons to reject precast panels. Panels in place may be rejected for any one of the product defects or installation deficiencies remaining after repairs and cleaning have been accomplished. "Visible" means visible to a person with normal eyesight when viewed from a distance of 20 feet (6 meters) in broad daylight.

B20 1.2.8 Window Sample Mock-Up

a. Provide mock-up of one (1) typical combination window unit to be used within the project and conduct a field mock-up test in strict compliance with American Architectural Manufacturers Association (AAMA) 502 method A and method B. Each opening must be tested to achieve performance of American Society of Civil Engineers (ASCE) 7-02 calculated requirements (PSF or Kg/m2) for water resistance, which must not exceed .667 % of the products capable water based on AAMA 101/I.S.2. Allowable rates of air leakage for field testing must be 1.5 times applicable AAMA 101/I.S.2 rate for the Product Type and Performance Class.

b. Exhibit transition and interconnection of windows to surrounding materials such as caulking, air barrier, vapor barrier, flashing, flashing end dams, subsill, and fasteners. Obtain DOR approval of materials interconnections prior to being cover by construction

c. Opening is to be tested under "Quality Control" testing by a designated independent testing agency.

1) Schedule mock-up installation sufficiently in advance of need to allow adequate time for cure of sealants, testing and reconstruction, if needed, without delaying the project.

2) Build mock-up in building enclosure wall in location selected by Owner and Architect.

3) Modify mock-up construction and perform additional tests as required to achieve specified minimum acceptable results. If corrections are not adequate, construct new mock-up, at written direction of Owner and Architect. Co-ordinate construction of mock-up with other involved trades.

4) Approved mock-ups may become part of completed Work if undisturbed at time of Substantial Completion.

5) Flood test Mock-up window subsill and obtain approval of DOR prior to installing window unit.

B20 1.3 DESIGN SUBMITTALS

Provide design submittals must be in accordance with PTS Sectioon Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, UFC 1-300-09N, *Design Procedures*, UFC 3-101-01, *Architecture,*and UFC 3-301-01, *Structural Engineering*.

In addition, UFGS sections listed below or in the body of the PTS text are to be used by the Designer of Record (DOR) as a part of the design submittal. If the UFGS products or systems are applicable to the project, the DOR must edit these referenced UFGS sections and submit them as a part of the design submittal specification. Edit the specification sections in accordance with the limitations stated in PTS Section Z10, *General Performance Technical Specifications*.

B20 1.4 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*. In addition to the Z10 requirements, the Designer of Record (DOR) must approve the following submittals as a minimum;

Shop drawings for reinforcing steel in masonry walls, doors, door hardware, windows, storefront, curtainwall, glazing, paint, exterior enclosure barrier systems, and visible exterior materials.

All structural elements necessary for construction.

B20 1.4.1 Manufacturer's Verification Inspection Documentation for Galvanized Steel

Submit manufacturer's verification inspection documentation for all galvanized steel in accordance with ASTM A123, ASTM A 153, and ASTM A 653.

B20 1.4.2 Field Inspection of Field-erected Concrete Panels

a. Perform field inspection of panel welded connections. Furnish the services of AWS-certified welding inspector for erection inspections. Welding inspector must visually inspect all welds and identify all defective welds.
b. Notify the DOR in writing of defective welds, bolts, nuts and washers within 7 working days of the date of inspection. Remove all defective connections or welds and re-welded or repaired as required by the DOR.

B20 1.4.3 Sustainable Construction Submittals

Submit sustainable construction submittals in accordance with Part 2 Section 01 33 29, *Sustainability Requirements and Reporting*.

B2010 EXTERIOR WALLS

Provide exterior wall construction that consists of exterior skin system of non-structural outside face elements with rain-screen back-up wall systems that include; flashing (embedded, exposed, and thru-wall), a water resistive barrier, moisture barrier/ vapor retarder (if required), air barrier, and insulation systems with interior skin system materials to provide a protective finish on the inside face of exterior walls. Provide all components necessary for a shingled water resistive barrier to direct water that would penetrate the wall to be directed to the outside of the wall. Provide exterior enclosure components and barriers in accordance with UFC 3-101-01, *Architecture*.

Design all work to comply with UFC 3-101-01, *Architecture*, and UFC 3-301-01, *Structural Engineering*, and the following requirements:

a. Vapor Pressure and Hygrothermal Analysis - Perform a job specific vapor pressure and hygrothermal analysis in accordance with UFC 3-101-01, *Architecture*. The conclusion of the analysis must indicate if a moisture barrier/ vapor retarder is required, the appropriate locations of needed moisture barrier/ vapor retarder, and anticipated dew-point locations in the exterior enclosure during different critical times of the year.
b. Wind Loads - Provide wind load calculations for exterior cladding in accordance with UFC 1-200-01 and UFC 3-301-01 with comparative analysis of the cladding system to be provided.
c. Water Penetration - No water penetration must occur at a pressure of 8 psf (39 Kg/m2) of fixed area when tested in accordance with ASTM E 331.
d. Insulating Value – Comply with UFC 3-101-01, *Architecture*, for the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) standards to determine the minimum insulating value of the complete wall system.

B201001 EXTERIOR CLOSURE

B201001 1.1 MASONRY VENEER EXTERIOR WALL CLOSURE COMPONENTS

B201001 1.1.1 General Requirements

a. The masonry veneer includes the non-load bearing exterior walls of the structure, and also includes colored mortar, special shapes such as sills, headers, trim units and copings of brick

masonry, precast concrete, concrete masonry units, or other approved materials. Tie the veneer to the backup wall system with a system that allows the veneer to move independently of the backup wall system, while being structurally supported. Allow for expansion and contraction of the veneer without cracking the exterior material.

b. Use running bond, tooled concave joints and full head joint weeps at 24 inches (610 mm) on center in the course immediately above the base flashing. Where rowlocks are permitted, slope rowlocks and project not less than 1/2 inch (13 mm) beyond the face of the wall to form a wash and drip. Where required, provide colored mortar conforming to ASTM C270. Provide special shapes where required.

c. Locate expansion/control joints and seal with proper backing material and ASTM C 920 polyurethane sealant, or preformed foam or rubberized expansion joint closure. Conform to UFC 3-101-01 and BIA Technotes 18, 18A. Match joint color of the brick, unless DOR directs otherwise.

d. Conform to ACI 530.1 for masonry veneer installation, including cold weather construction. Antifreeze admixtures are not to be used.

e. Clean the masonry in accordance with manufacturer's instructions and BIA Technote 20.

f. Utilize BIA Technical Notes to design, detail, and construct brick masonry walls. This PTS section amends the BIA documents and takes precedence over similar BIA requirements. Substitute directive language in the place of BIA suggestive language as required in PTS Section Z10, *General Performance Technical Specifications*. The results of these wording substitutions change this document to required procedures.

B201001 1.1.2 Face Brick

a. Brick Masonry Appearance - Do not change source or supply of materials after brick manufacturing work has started. Blend all brick to produce a uniform appearance when installed. An observable "banding" or "layering" of colors or textures caused by improperly mixed brick is unacceptable.

b. Brick Type – Provide brick in accordance with ASTM C216, Grade SW, type FBX. Test rating of ASTM C67 must be "Not effloresced".

B201001 1.1.3 Split Faced or Ground Faced Masonry

ASTM C 90. If required, provide split faced or ground faced units, or split-ribbed units or scored-faced units.

B201001 1.1.4 Cast Stone Trim Units

a. Cast stone must be the product of a manufacturer regularly engaged in the manufacture of architectural cast stone (precast concrete building unit) products. Meet or exceed the requirements of ASTM C 1364.

b. Trim units of cast stone include sills, fascias, header units, copings and other trim units as required by the approved design.

B201001 1.1.5 The Wall Cavity

Comply with UFC 3-101-01, *Architecture*and BIA Technical Notes 21A, 21B, 21C, 28B.

B201001 1.1.6 Through-Wall Flashing Components

Provide through-wall flashing over all openings, spandrels, shelf angles, lintels, and built-in structural steel members. Provide through-wall flashing below all openings, parapets copings, sills, and at the base of the wall. Provide a method of weeping water collected by the through-wall flashing to the outside of the wall.

a. Incorporate weep holes to align with through-wall flashing in cavity wall construction as required by UFC 3-101-01, *Architecture*, and BIA Technotes. Install flashing according to BIA Technotes 7, 7A, 7B, 21A, 21B, 21C, 28B, and SMACNA figures 4-1A and 4-1B. Extend metal drip edge flashing beyond the wall plane using a 1/4 inch (6 mm) preformed 45 degree angle turn down.
b. Provide flashing material as required by UFC 3-101-01, *Architecture*and the following: Provide flashing of 7 ounce copper flashing with a 3 ounce bituminous coating on each side or a fiberglass fabric bonded on each side of the copper sheet. Sixteen (16) ounce uncoated copper, 28 gauge Type 302 or 304 stainless steel is also acceptable. 'Flexible membrane flashing, plastic or PVC-based membrane flashing is prohibited. Lap and seal turndown solid metal drip edge flashing to through-wall flashing. Refer to "Flashing" in this section to find requirements for non-through-wall flashing.
c. Incorporate the through-wall flashing in the water resistive barrier and seal joints to flashing to form a shingled effect and direct water to the exterior to the exterior enclosure and away from back-up wall assembly.
d. Where flashing is not continuous, such as at masonry wall opening heads and sills, extend flashing four inches beyond each side of the opening and turn up ends to form a pan and prevent water from reentering the wall cavity.

B201001 1.1.7 Reinforcing in Veneer Layer

Reinforcing in the veneer layer must be galvanized in accordance with ASTM A 123/A123M, ASTM A153/A153M, or ASTM A653/A653M, Z275 (G90) coating, and be of sufficient size to eliminate damage to the veneer layer from wind and other live and dead loads imposed on the veneer layer.

B201001 1.2 CONCRETE EXTERIOR WALL CLOSURE

B201001 1.2.1 Precast Concrete Wall Panels:

ACI 211.1 and ACI 301. PCI MNL-116 or PCI MNL-117. Concrete must have a minimum 28-day compressive strength of 4000 psi (281 Kg/cm2). Air content of plastic concrete must be between 4 and 6 percent air by volume. Provide a dosage of air entraining agent, which will produce 19 plus or minus 3 percent air in a 1 to 4 by weight standard sand mortar in accordance ASTM C 185. Provide aggregate in accordance with

ASTM C 33. Seal the panel joints with fully loaded and tooled sealant joints that are properly sized, shaped, and placed against manufacturer approved backing material. Sealant material thickness must not be less than 1/4 inch (6mm).

For rain screen precast panel wall systems with back-up wall construction, provide sealed face joints that allow moisture to be drained from the wall cavity behind the precast panels via weeps. Provide flashing and water/ moisture resistant barriers to direct water from the wall cavity to the outside of the building. Locate weeps where cavity is obstructed such as above through-wall flashing, at head and sill flashing above and below windows, above door flashings, and wall base flashing.

For barrier wall precast panel wall systems without back-up wall construction, provide a two stage drained joint system on all precast panels joints. Design the two staged drained joint system to provide the following;

a. Locate all sealant beads on the exterior side of the backer rod. Align placement of the exterior sealant bead with the exterior surface of the precast panel and space the placement of the interior sealant bead as required below but no less than 3 inches (75 mm) from the face of the panel to the face of the interior tooled sealant bead.
b. Space sealant beads as far apart as possible but provide no less than 1 inch (25mm) clear air space between the exterior seal backer rod and the tooled interior sealant bead.
c. Form minimum of 1/2 inch (12mm) weep holes to facilitate drainage in the vertical sealant joints. Attach a bead of sealant to the interior vertical sealant bead with an outward slope and a drop in height of at least 4 inches (100mm) to form the drainage plane for the weep opening.
d. Locate weeps as necessary to allow complete drainage of water from the two stage air/ vent space. Provide weeps at obstructions in the air/ vent space such as through wall flashing, horizontal panel joints, head and sill flashing above and below windows, above door flashing, and wall base flashing.

Minimize cracking potential of precast concrete elements by implementing expansion and control joints in the precast assembly. Comply with the following;

a. Exposed Aggregates - In addition to the above aggregate, facing mixture aggregate, and aggregate for homogeneous panels with exposed aggregate finish, must be crushed stone.
b. Cement - ASTM C 150.
c. Admixtures - ASTM C 260 for air-entraining admixtures. Other admixtures: ASTM C 494. Certify that admixtures are free of chlorides.
d. Reinforcement - ACI 301.
e. Inserts - ASTM A 47, Grade 32510 or 35018, or may be medium strength cast steel conforming to ASTM A 27/A 27M, Grade U-60-30. Where exposed to moisture, provide inserts hot-dip galvanized after fabrication in accordance with ASTM A 153/A 153M.

f. Embedded Plates - ASTM A 36/A 36.

g. Flashing Reglets - Fabricate of sheet metal, open-type with continuous groove 1-1/8 inches (28 mm) deep minimum by 3/16 inch (5 mm) wide at opening and sloped upward at 45 degrees. Top surface must have toothed lip section to anchor upturned edge of metal snap-lock counter flashing when inserted. Provide stainless steel sheet metal, 0.011 inch (0.28 mm) minimum thickness, ASTM A 167, Type 302 or Type 304, Number 2D finish, soft temper.

h. Clip Angles - ASTM A 36/A 36M steel, galvanized after fabrication in accordance with ASTM A 153/A 153M.

i. Ferrous Casting Clamps - ASTM A 47, Grade 32510 or Grade 35018 malleable iron or cast steel, or ASTM A 27/A 27M, Grade U-60-30, cast steel casting, hot-dip galvanized in accordance with ASTM A 153/A 153M.

j. Threaded Fasteners – Provide galvanized machine bolts, washers and, when required, nuts.

1) Bolts: ASTM A 449, 3/4 inch (19 mm) diameter machine bolts with hexagon head.

2) Washers: American National Standards Institute (ANSI) B18.21.1, medium or heavy lock-spring washers.

3) Nuts: ASTM A 563, Grade C, heavy, hexagon-type nuts.

4) Square Nuts: ASTM A 563, Grade A, plain.

B201001 1.3 CONCRETE WALL PANEL RESTORATION

Match the materials, physical and chemical properties, and composition of new concrete of the existing concrete to be repaired, unless samples and testing determine that existing mixtures and materials are faulty or non-performing.

B201001 1.3.1 Existing Concrete Testing

Take representative samples of existing concrete from areas of the structure to be repaired at indicated locations. Take samples in accordance with ASTM C 42 and ASTM C 823 and test in accordance with ASTM C 39, ASTM C 42, ASTM C 295, ASTM C 457, ASTM C 856, ASTM C 1218/C 1218M, and ASTM C 642, ASTM C 114, and ASTM C 1084. Evaluate aggregates in the existing concrete in accordance with ASTM C 136 and ASTM C 295. Determine the air content of the existing concrete in accordance with ASTM C 457 and ASTM C 642.

B201001 1.3.2 Admixtures

Air entraining admixtures must conform to ASTM C 260, water-reducing or -retarding admixtures must conform to ASTM C 494, and pigments for integrally colored concrete must conform to ASTM C 979 and ASTM C 1017. Admixtures must not contain added chlorides.

B201001 1.3.3 Aggregates

Aggregates must conform to ASTM C 33.

B201001 1.3.4 Cement

Match cement composition of cement used in existing concrete to be repaired as determined by samples and testing and conforms to the basic requirements of ASTM C 150, Type I or II. Provide cement with non-shrink (shrinkage compensating) properties and conforms to ASTM C 1107, Class B or C, expansive cement type.

B201001 1.3.5 Pozzolan

Provide pozzolan to conform with ASTM C 618, Class F, including limit on available alkalis, "Table 2 - Supplementary Optional Chemical Requirements," and uniformity requirements, "Table 4 - Supplementary Optional Physical Requirements."

B201001 1.3.6 Epoxy Anchor Adhesives

Use epoxy-resin grout to bond steel anchors to concrete with a 100 percent solids, moisture insensitive, low creep, structural adhesive. The epoxy must conform to ASTM C 881, type IV; grade and class selected to conform to the manufacturer's recommendations for the application. The epoxy adhesive must be conditioned, proportioned, mixed, and applied in accordance with the manufacturer's recommendations, except as otherwise specified herein.

a. Epoxy-resin grout - Provide a two-component material, 100 percent solids by weight, formulated to meet the requirements of ASTM C 881, Type I or II. Use type I material when materials or atmospheric temperatures are 70 degrees F (21 degrees C) or above. Use type II material when materials or atmospheric temperatures are below 70 degrees F (21 degrees C). Provide epoxy-resin grout with the ability to structurally rebond cracks, delaminations, and hollow plane conditions in concrete; must be insensitive to the presence of water; and must have the capability to penetrate cracks down to 5 mils in width. Materials must have been successfully used in similar conditions for a period of at least five years.
b. Epoxy Injection Ports – Design injection ports for epoxy-resin grout for the intended use as required in this section and made according to the recommendation of the epoxy manufacturer.

B201001 1.4 OTHER EXTERIOR WALL CLOSURE

B201001 1.4.1 Concrete Unit Masonry

Masonry walls must comply with ACI 530.1. Load-bearing units: ASTM C90, Non-load bearing- units: ASTM C129, Type I or II. Provide ground face units, split-faced units, or split-ribbed units for exposed exterior walls. Provide water repellent admixture to masonry units where the exterior face of the units will not receive a waterproof coating such as paint. Mortar must conform to ASTM C 270, Type S. Test mortar in accordance with ASTM C 780. Provide water repellent admixture and color additive in mortar for masonry walls that will not receive a waterproof coating such as paint. Do not use admixtures containing chlorides. Provide air entrainment, not to exceed 12 percent, in mortar.

a. Adjustable Anchors for Structural Members - Use adjustable anchors to anchor masonry structural steel columns or beams. Weld the fixed portion of the anchors (steel anchor rods) to the structural steel member. Provide adjustable anchors 3/16 inch (5 mm) diameter steel wire, triangular-shaped. Anchors attached to steel must be 5/16 inch (8 mm) diameter steel bars placed to provide 1/16 inch (1.6 mm) play between flexible anchors and structural steel members.
b. Deformed Bars - ASTM A 615/A 615M, ASTM A 616/A 616M, ASTM A 617/A 617M, or ASTM A 706/A 706M.

B201002 EXTERIOR WALL BACKUP CONSTRUCTION

B201002 1.1 CONCRETE UNIT MASONRY

Provide concrete unit masonry as described in B201001 1.10.2

Provide water resistive barrier on the cavity-facing wythe of the backup masonry. Coordinate water resistant barrier materials and methods to provide water control and vapor transmission control for the lifetime of the structure. Seal all holes and penetrations in the water resistive barrier and repair any material damaged by other construction operations.

B201002 1.2 CAST-IN-PLACE CONCRETE SYSTEM

a. Unless otherwise noted herein, all concrete design and construction must be in accordance with UFC 1-200-01.
b. Provide concrete construction ccordance with ACI 301.
c. Refer to Performance Verification Testing for Cast-in-place field quality control.
d. Concrete construction tolerances must be in accordance with ACI 117.
e. Design for watertight joints, or weeping joints having back-up water penetration protection in precast elements. Minimize cracking potential of precast concrete elements by implementing expansion and control joints in the precast assembly.
f. Joints must include properly sized and placed backing material and fully loaded and tooled sealant joint of no less than 1/4 inch sealant material thickness.
g. Provide a water resistive barrier to protect back-up wall assembly.

B201003 INSULATION AND VAPOR RETARDER

Provide insulation, air barriers, water resistive barriers, and moisture barrier/ vapor retarders (if required) in the exterior enclosure to control heat loss/gain, air infiltration/diffusion, moisture infiltration/diffusion, and water infiltration.

Provide insulation, air barrier and water resistive barrier on all conditioned facilities and moisture barrier/ vapor retarders when required by the exterior enclosure vapor pressure and hygrothermal analysis. These barrier materials may be installed separately or combined if different air barrier, moisture barrier/ vapor retarder, and water resistive barrier functions can be consolidated in one material.

Provide exterior enclosure barriers that are durable and designed to last the life of the facility. Seal the continuous air and water resistive barrier in a flexible

manner to allow for relative movement of adjacent building enclosure components. Support exterior enclosure barriers to withstand maximum positive and negative air pressure to be placed on the building without displacement or damage and transfer the load to the structure. Permanently seal penetrations, joints, holes, and transitions to adjoining construction in air and water resistive barriers as recommended by the material manufacturer. Do not compromise exterior enclosure barrier integrity at electrical boxes, fixture supports, and fasteners with holes through the exterior enclosure barriers that allow air or water leakage. Do not expose exterior enclosure barriers or retarders to environment conditions longer than is recommended by the manufacturer.

B201003 1.1 INSULATION SYSTEMS

Provide vertical and horizontal polystyrene insulation conforming to ASTM C578 or rigid polyisocyanurate board wall insulating products conforming to ASTM C591 or mineral-fiber blanket insulation conforming to ASTM C 665. Wall insulating product must have a minimum R-value as indicated by applicable ASHRAE 90.1 calculations called for in UFC 1-200-02, *High Performance and Sustainable Building Requirements*, and meeting minimum building envelope insulation requirements of UFC 3-101-01 *Architecture*and the energy design of the facility. Seal the joints in rigid insulation within cavity/veneer walls for additional moisture and air infiltration protection.

B201003 1.1.1 Bituminous Dampproofing

Bituminous Dampproofing shall be ASTM D449, Type I or Type II bituminous dampproofing on the exterior surface of the interior wythe of masonry in a cavity wall (back-up wall for masonry veneer).

B201003 1.1.2 Building Paper

FS UU-B-790, Type I, Grade D, Style 1. Where required, provide over sheathing on wood or metal framed wall construction to eliminate water penetration.

B201003 1.1.3 Polyethylene sheeting

ASTM 4397, minimum 6 mil thickness. Provide typically on the interior face of insulated, wood or metal stud wall construction, unless a moisture vapor analysis indicates otherwise. (Poly sheeting on the interior surface of the studs is not recommended for cold, mixed-humid, mixed-dry, hot-humid or hot-dry climates.)

B201003 1.2 AIR BARRIER

The building air barrier is a combination of various construction materials/ components that form a continuous air barrier seal on all six sides of a building. Use methods recommended by the manufacture to seal joints and intersections for air-tightness of materials designated as part of the air barrier. Individual materials used in the continuous air barrier must have an air permeance not to exceed 0.004 cfm/ft2 at a pressure differential of 0.3 inches water (1.56lb/ft2), (0.02 L/s. m2 at 75 Pa) when tested in accordance with ASTM E 2178. If the air barrier is to be field tested, refer to the requirements in the paragraph entitled "Air Barrier Performance Testing" of this section for entire building minimum air permeance. Provide

air barrier installation at windows in accordance with ASTM E 2112.

B201003 1.2.1 Exterior Enclosure Air Barrier Materials

Refer to Air Barrier Association of America (ABAA) to identify qualified materials with the appropriate performance for the air barrier. Utilize materials from the "ABAA Evaluated Air Barrier Materials" found at the following web link; http://www.airbarrier.org/materials/index_e.php

B201003 1.3 WATER RESISTIVE BARRIER

Provide a water resistant barrier to resist bulk water penetration and wind-driven rain that passes the exterior cladding of the facility. Provide vapor permeable water resistant barrier if the water resistive barrier function is combined with other exterior enclosure barrier functions. Integrate water resistive barriers with wall flashing to form a shingled effect and direct water down the outside surface of the water resistive barrier, away from the back-up wall assembly, and out of the wall. Comply with the requirements of ASTM E2256 for mechanical fastened building wrap materials or ICC-ES Acceptance Criteria AC38 for other materials.

B201003 1.3.1 Exterior Enclosure Water Resistive Barrier Materials

Refer to Air Barrier Association of America (ABAA) to identify qualified materials with the appropriate performance for the water resistive barrier. Utilize materials from the "ABAA Evaluated Air Barrier Materials" found at the following web link; http://www.airbarrier.org/resistive/index_e.php

B201003 1.4 MOISTURE BARRIER/ VAPOR RETARDER

Provide a moisture barrier/ vapor retarder to slow or reduce the unintended movement of water vapor in and out of conditioned space, if required by exterior enclosure vapor pressure and hygrothermal analysis. Perform the analysis and provide a moisture barrier/ vapor retarders in accordance with UFC 3-101-01, *Architecture*. Choose the moisture barrier/ vapor retarder permeability as a function of climate, the characteristics of the materials that comprise the assembly, and the interior conditions. If required, install moisture barrier/ vapor retarder materials on the warm side of the building assembly insulation (in the predominate season for the facility climate). Select moisture barrier/ vapor retarders in accordance with ASTM C755.

B201004 PARAPETS

Avoid parapets when possible, but when necessary, provide parapets with the same materials as the exterior wall construction, including framing members, anchors, flashings, cants, and accessories. Design parapets to withstand the lateral loads prevailing at the project site and be provided with thruwall flashing below the parapet cap, at structural members, at penetrations, and at the roof level. Provide flashing and scuppers in accordance with SMACNA.

B201005 EXTERIOR LOUVERS & SCREENS

If required, provide louvers, which are not an integral part of the mechanical

equipment, exterior closures, grilles and screens, storm shutters, and other materials used for a variety of purposes including screening of equipment or as louvers for exterior doors.

Louvers, screens, grilles in must be selected in a color and design that is compatible with the fabric of the exterior architectural character as described below. For frame construction, install in accordance with ASTM E 2112.

B201005 1.1 WALL LOUVERS

Provide drainable blade type wall louvers with blade slopes of 45 degrees minimum, but provide wind driven rain rated louvers for wall louvered rooms without a floor drain within the room. Louvers must withstand a wind load of not less than 30 psf (146 Kg/m2), .08 inch (2 mm) thick 6063-T5 or T52 extruded aluminum in a factory-finished color in accordance with AAMA 2605 with a minimum coating thickness of 1.2 mil to match the building facade. Wall louvers must bear the AMCA certified ratings program seal for air performance and water penetration in accordance with AMCA 500 , 500L (wind driven rain), and AMCA 511. Provide sill flashing with sloped drain pan at base of louver to collect moisture that migrates down the interior face of the louver. This sill flashing must drain water to the outside of the building. Louvers must have bird screens.

B201005 1.2 SCREENED EQUIPMENT ENCLOSURE

Design and fabricate support frames to withstand wind loads. Anchor frames securely in place. Provide secondary horizontal steel or aluminum framing for attachment of screen materials. Screen material must be factory finished coating in accordance with AAMA 2605 with a minimum coating thickness of 1.2 mils. Form metal panels from galvanized steel sheet in accordance with per ASTM A 653 or aluminum sheet in accordance with ASTM B 209.

B201006 BALCONY WALLS & HANDRAILS

B201006 1.1 HANDRAILS

Design handrails and anchorage connections to resist loads in accordance with IBC. Provide steel and aluminum materials in accordance with NAAMM Pipe Railing Systems Manual, with the same size handrail and vertical post. Provide series 300 stainless steel pipe collars. Factory coat all metal railings, except ornamental metals such as brass, bronze, and nickel-silver, with a high performance coating in accordance with AAMA 2605 for aluminum with a minimum coating thickness of 1.2 mils unless otherwise noted. For steel handrails provide finish coating in accordance with UFGS 09 96 00, *High Performance Coatings*.

B201006 1.1.1 Fiber Reinforced Plastic (FRP) Handrails

Provide FRP handrails in structural shapes manufactured by the pultrusion process with qualities, quantities, properties, arrangements and dimensions as necessary to meet the design requirements in accordance with ASCE 7,29 Code of Federal Regulations (CFR) 1910.23, National Fire Protection Association (NFPA) 101. Provide integral UV inhibitors within the resin, synthetic surfacing veil to help produce a resin rich surface, and UV resistant coating for outdoor exposures.

B201006 1.1.2 Steel Handrails

Provide steel handrails, including inserts in concrete, steel pipe conforming to ASTM A 53 or structural tubing conforming to ASTM A 500, Grade A or B of equivalent strength. Steel railings must be of 1 1/2 inches (38 mm) nominal size. Railings must be hot-dip galvanized, shop primed shop painted for exterior applications.

B201006 1.1.3 Aluminum Handrails

Aluminum railing must be of 1-1/2 inch (38 mm) nominal schedule 40 pipe conforming to ASTM B 429 or 1-3/4 inch (44 mm) square aluminum semi-hollow tube with rounded corners conforming to ASTM B 221. Railings must be coated with a high performance coating or anodized in accordance with AAMA 612, Class I. All fasteners must be series 300 stainless steel.

B201007 EXTERIOR SOFFITS

Exterior soffit system assemblies must include trim and necessary accessories including high performance coatings, if required. Installation must be crisp, fit and trim with tight joinery to back-up framing. Design soffits to be field assembled by lapping side edges of adjacent panels and mechanically attaching through panels to galvanized, non-load bearing framing conforming to ASTM A 653 (G60) and ASTM C 645, using concealed fasteners. Provide trim accessories of the same material and finish as the soffit material where soffit abuts other materials.

Use adequate backing material to assure snug joints and even face planes. Where soffits ventilate an attic space, or an otherwise unventilated space, provide a soffit/ridge/louver/ventilator ventilation system with air quantities complying to the IBC. For spaces intentionally not vented, provide sealed soffits to maintain the integrity of the air barrier and insulation barrier.

B201007 1.1 METAL SOFFIT PANELS

Provided metal soffit panels factory-formed and factory-finished. Use factory-applied sealant in side laps

B201008 WALL FLASHING

Flashing shall be aluminum or stainless steel. Aluminum shall conform to ASTM B 209/B 209M, 0.040 inches (1.27 mm) thick and shall be coated to match the item flashed. Stainless steel shall conform to ASTM A 167, type 302 or 304, 2D finish, fully annealed, dead soft temper. Thickness shall be a minimum of 0.018 inches (0.4572 mm).

B201009 EXTERIOR PAINTING AND SPECIAL COATINGS

Apply coatings directly to all non-prefinished surfaces of the exterior construction. Comply with Master Painters Institute requirements for surface degradation analysis, surface preparation, paint and coating selection, paint application restrictions for substrate materials, and paint application.

B201009 1.1 GENERAL REQUIREMENTS

Painting practices must comply with applicable federal, state and local laws enacted to insure compliance with Federal Clean Air Standards. Apply coating materials in accordance with Society for Protective Coatings (SSPC) PA 1. SSPC PA 1 methods are applicable to all substrates.

Provide all paint in accordance with the Master Painter Institute (MPI) standards for the exterior architectural surface being finished. The current MPI, "Approved Product List" which lists paint by brand, label, product name and product code as of the date of contract award, will be used to determine compliance with the submittal requirements of this specification. The Contractor may choose to use a more current MPI "Approved Product List"; however, only one list may be used for the entire contract. All coats on a particular substrate, or a paint system, must be from a single manufacturer. No variation from the MPI Approved Products List is acceptable.

Select paint systems for the project in accordance with the MPI Architectural Painting Decision Tree available on the Whole Building Design Guide. Use this interactive MPI Decision Tree website to identify applicable paint system(s) for the project. The MPI Decision Tree identifies paint systems for each interior or exterior coated surface in "Normal" or "Aggressive" environmental conditions and generally lists the applicable paint systems in descending order of performance. The paint system at the top of each substrate list generally indicates the highest performing acceptable coating system.

Choose the "Aggressive" environmental conditions in the MPI Decision Tree for exterior systems that are used in moist humid conditions, abrasive conditions, chemical exposure conditions, or within five miles proximity of the ocean or a body of water. Also use "Aggressive " environmental conditions in interior spaces that are exposed to in moist humid conditions, abrasive conditions, chemical exposure conditions, such as bathrooms, shower rooms, kitchens, chemical storage area, swimming pools, laundry, sanitary areas, commercial kitchens, industrial production areas, and hospital operating rooms provide paint systems that comply with the MPI Decision Tree "Aggressive" environmental conditions.

Comply with the following requirements when determining the appropriate paint or coating system from the MPI Decision Tree:

a. Some of these paint systems are identified with a "NAVFAC Anchor". This "NAVFAC Anchor" indicates the minimum performing system that NAVFAC will accept for that substrate and environmental conditions.

b. When multiple "NAVFAC Anchors" are indicated on a certain substrate and environmental condition, provide the "NAVFAC Anchor" paint or coating system that is most appropriate for the facility use.

c. If only one MPI Decision Tree choice is available for a certain substrate and environmental condition with no indicated NAVFAC preference, provide that sole option for NAVFAC projects.

d. If the MPI Decision Tree provides multiple choices and no NAVFAC preference is denoted, refer to the Additional RFP Requirements below to determine level of performance.

e. If the MPI Decision Tree does not identify all paint system applicable to the facility, utilize the *MPI Architectural Painting, Exterior Systems Manual* to identify other appropriate paint systems for the project. Utilize the "Premium Grade" systems and comply with all limitations stated in the MPI "Approved Product List" for each paint product. Products having an MPI VOC Range E3 must be given preferential consideration over lower VOC Ranges. Use higher performing paint systems unless the lower performing paint system can be justified based on a lifecycle cost to include surface preparation, application, disposal, environmental impact, and required recoating cycles. Only use paint products that have been tested for MPI'S "DETAILED PERFORMANCE" or "EVALUATED PERFORMANCE ". Do not use products that have only been tested for "INTENDED USE".

f. If an "Aggressive" environmental condition option is not available in the MPI Decision Tree for a certain substrate, use the "Normal" environmental condition option.

g. Refer to the Additional Exterior Paint and Coating System Requirements below for further system requirements.

Paints and coatings must comply with Master Painters Institute Green Performance Standard GPS-1-12 which is available at the following website; http://www.specifygreen.com/EvrPerf/EnvironmentalPerformance.html . Choose paints that provide performance, are environmentally friendly, and that conform to EPA or local environmental regulations, whichever requires the lowest VOC content.

B201009 1.1.1 MPI Gloss Levels

Gloss levels must comply with the MPI system of determining gloss as defined in the Evaluation sections of the MPI Manuals. Utilize the performance characteristics of the paint gloss and sheen to categorize paint rather than manufacturers' description of the product. The MPI Gloss Levels are indicated by the notation G1, G2, G3, G4, G5, G6, or G7. Navy only uses MPI Gloss Levels G2, G3, G5, G6.

The MPI Decision Tree indicates a default gloss level for each paint system, however consider the appearance, anticipated conditions, and need for cleaning when establishing the final gloss level for each coated surface of the project. Comply with the following guidance in choosing the appropriate gloss level.

a. Use G2 "Velvet-like" Flat for ceilings, residential walls away from human contact and low traffic areas.

b. Use G3 "Eggshell-like" in high traffic areas for ceilings and walls, when human contact with the wall is limited, and for dark accent colors.

c. Use G5 Semigloss for walls, doors and trim for high durability and clean ability and when a surface is expected to have routine human contact.

d. Use G6 Gloss only in special situations such as for piping identification or special effects.

The MPI gloss and sheen standard values are in accordance with ASTM D523, and are as follows:

Gloss Level Number	Gloss@60 Degrees	Sheen@85 Degrees
Gloss Level 1 (G1) - Matte or Flat	Max.5 units	Max.10 units
Gloss Level 2 (G2) - "Velvet-like" Flat	Max. 10 units	10-35 units
Gloss Level 3 (G3) - "Eggshell-like"	Max. 10-25 units	10-35 units
Gloss Level 4 (G4) - "Satin-like"	Max. 20-35 units	Min. 35 units
Gloss Level 5 (G5) - Semi-Gloss	35-70 units	
Gloss Level 6 (G6) - Gloss	70-85 units	
Gloss Level 7 (G7) - High Gloss	More than 85 units	

B201009 1.1.2 MPI System Designations and Table Abbreviations

The MPI coating system number description is found in either the *MPI Architectural Painting Specification Manual*or the *Maintenance Repainting Manual*and defined as an exterior system

a. EXT - MPI short-term designation for an exterior coating system on a new surface.
b. REX - the MPI short term designation for an exterior coating system used in repainting projects or over existing coating systems.
c. DSD - the MPI short-term designation for Degree of Surface Degradation as defined in the Assessment sections in the *MPI Maintenance Repainting Manual*. Degree of Surface Degradation designates the MPI Standard for description and appearance of existing condition of surfaces to be painted. This DSD classification is used to determine the proper surface preparation necessary for painting.

B201009 1.1.3 Surface Preparation

Comply with the "Exterior Surface Preparation" section of the *MPI Architectural Painting Specification Manual*,or the Exterior Surface Preparation" section of the *MPI Maintenance Repainting Manual*. All suggestive language such as "may" or "should" are deleted from the standard and "must" inserted in its place. Suggestive language such as "recommended" or "advisable" is deleted from the standard and "require" or "required" inserted in its place. The results of these wording substitutions change this document to required procedures. For surface preparation, determine a MPI DSD Assessment of each surface and comply with the MPI Surface Preparation Requirements relating to the assessments. Not-withstanding MPI requirements, clean exterior ferrous metal that is exposed to weather conditions (wind, precipitation, solar degradation, and humidity) to a SSPC SP 10 level (near white).

Remove dirt, splinters, loose particles, grease, oil, and other foreign matter and substances deleterious to coating performance as specified for each substrate before application of paint or surface treatments. For existing buildings, use MPI *Maintenance Repainting Manual* to determine the coatings that need to be removed. Remove deteriorated or loose coatings before repainting begins. Remove oil and grease prior to mechanical cleaning. Program cleaning so that dust and other contaminants will not fall on wet, newly painted surfaces. Spot-prime exposed ferrous metals such as nail heads on or in contact with surfaces to be painted with water-thinned paints with a suitable corrosion-inhibitive primer capable of preventing flash rusting and compatible with the coating specified for the adjacent areas.

B201009 1.2 ADDITIONAL EXTERIOR PAINT AND COATING SYSTEM REQUIREMENTS

In addition to the MPI Decision Tree, comply with the following paint system requirements:

B201009 1.2.1 Pavement Coatings

a. EXT 3.2 Concrete Horizontal Surfaces

Normal/ Aggressive Condition; Pigmented;

Provide road and parking lot pavement marking in accordance with UFGS Section 32 17 23, *Pavement Markings*.

b. EXT 10.2 Bituminous Coated Surfaces

Normal/ Aggressive Condition; Pigmented;

Provide road and parking lot pavement marking in accordance with UFGS Section 32 17 23, *Pavement Markings*.

B201009 1.2.2 Hot Metal Surfaces (including smokestacks),

a. EXT 5.2 Hot Metal, Up to 205 degrees C 400 degrees F

Normal/ Aggressive Condition; Pigmented

(1) EXT 5.2A - Heat Resistant Enamel

Primer: Intermediate/ Topcoat:

MPI 21 Surface Preparation and numbers of coats in accordance with manufacturers' instructions.

b. EXT 5.2 Hot Metal (Ferrous), Up to 400 degree C, 750 degree F

Normal/ Aggressive Condition; Pigmented;

(1) 5.2C - Heat resistant - inorganic zinc coating

Primer: Intermediate/ Topcoat:

MPI 19 Surface Preparation and numbers of coats in accordance with manufacturers' instructions.

(2) 5.2B - Heat resistant - aluminum finish enamel

Primer: Intermediate/ Topcoat:

MPI 2 Surface Preparation and numbers of coats in accordance with manufacturers' instructions.

c. EXT 5.2 Hot Metal (Non-Ferrous), Up to 593 degree C, 1100 degree F

Normal/ Aggressive Condition; Pigmented

(1) 5.2D - Heat Resistant Coating

New and existing surfaces cleaned bare to SSPC SP 10/NACE No. 2

Primer: Intermediate/ Topcoat:

MPI 22 Surface Preparation and numbers of coats in accordance with manufacturers' instructions.

B201009 1.3 EXTERIOR CONCRETE MASONRY FINISHES

New and Existing, previously painted concrete masonry:

a. Latex, System DFT: 11 mils

1) MPI EXT 4.2A-G3/G4 (Low sheen) / REX 4.2-G5; BF:MPI 4, P:MPI 15, I: MPI 15, T: MPI 15

New and Existing Profiled Block (Split Faced Block)

a. Latex System DFT: 11 mils

1) MPI EXT 4.2L-G3/4 (Satin-like) P: MPI 3 I: MPI 15 T: MPI 15

B201009 1.4 EXTERIOR METAL FINISHES

B201009 1.4.1 New and existing steel that has been blast cleaned to SSPC SP 6 & 10:

a. Alkyd, System (in SSPC Zones 1B and 2A) DFT: 5.25 mils

1) MPI EXT/ REX 5.1D-G5 (Semigloss); P:MPI 79, I:MPI 94, T:MPI 9

b. Waterborne Light Industrial (in SSPC Zones 1B, 3A, 3B, and 3C), System DFT: 8.5 mils

1) MPI EXT 5.1R-G5 (Semigloss); P:MPI 101, I:MPI 108, T:MPI 163

B201009 1.4.2 New Galvanized surfaces:

a. Epoxy P/Waterborne Light Industrial (Use MPI 25 cleaner), System DFT: 4.5 mils

1) MPI EXT 5.3K-G5 (Semigloss); P:MPI 101, I:MPI 161, T:MPI 161

B201009 1.4.3 Galvanized surfaces with slight coating deterioration, with little or no rusting:

a. Epoxy P/Waterborne Light Industrial Coating (Use MPI 25 cleaner), System DFT: 4.5 mils

1) MPI EXT 5.3K-G5 (Semigloss); P:MPI 101, I:N/A, T:MPI 163

B201009 1.4.4 Galvanized surfaces with severely deteriorated coating or rusting:

a. Epoxy P/Waterborne Light Industrial Coating (Use MPI 25 cleaner), System DFT: 8.5 mils

1) MPI EXT 5.3K-G5 (Semigloss); P:MPI 101, I:MPI 163, T:MPI 163

B201010 EXTERIOR JOINT SEALANT

Provide sealant joint design, priming, tooling, masking, cleaning and application in accordance with the general requirements of *Sealants: A Professionals' Guide*from the Sealant, Waterproofing & Restoration Institute (SWRI). All sealant must conform to ASTM C 920.

Joints must include proper backing material for sealant support during application, control of sealant depth, and to act as a bond breaker. Use filler boards, backer rods and bond breaker tapes. Provide priming unless specifically not recommended by the sealant manufacturer. Applied sealant must be tooled. Tooling must not compact sealant too less than the minimum sealant thickness required. Mask adjacent surfaces to control sealant boundaries during sealant

application.

B201011 SUN CONTROL DEVICES (EXTERIOR)

Sun control devices must be manufactured devices to provide sun control on exterior windows and storefronts. Provide sun control devices to withstand the wind loads prevailing at the project site.

B201011 1.1 EXTERIOR SUN SCREENS

Exterior sun screens must be of aluminum with 6063-T5/T6 aluminum demountable frame attachment. Screen material must be formed factory finished metal from aluminum sheet in accordance with ASTM B 209. Screen material must be factory finished coating in accordance with AAMA 2605 with a minimum coating thickness of 1.2 mils. Sunscreen must be awning, fin or other type appropriate to the installation.

B201012 SCREEN WALL

Screen walls include attached or unattached walls adjacent to the main building. Screen walls must conform to the applicable portions of Section B201001 EXTERIOR CLOSURE.

B201090 OTHER EXTERIOR WALLS

B2020 EXTERIOR WINDOWS

Provide standard windows in compliance with American National Standards Institute/American Architectural Manufacturers Association/Window and Door Manufacturers Association (ANSI/AAMA/WDMA) 101, Steel Windows Institute (SWI) SWS, UFC 4-010-01, and the design criteria of ASCE 7 for glazed windows to meet the Building Code.

If required, provide windows that meet the requirements of AAMA/WDMA 101/I.S.2. Residential construction must utilize windows that comply with AAMA LC-25 designation unless the wind pressure on the building exceeds 38 psf (185 Kg/m2). Commercial (non-residential) construction must utilize windows that comply with AAMA designation HC-40 (60 psf - 293 Kg/m2) for windows that do not have to meet anti-terrorism requirements, and HC-60 (90 psf - 439 Kg/m2) for commercial windows that are required to meet anti-terrorism requirements, unless the wind pressure or blast pressure on the building exceeds the design pressure for these minimum windows. Determine the wind pressure on the building by converting the ASCE-7 basic wind speed to wind pressure and find the corresponding structural test pressure in the AAMA specific requirements or optional performance tables. If the residential window wind pressure exceeds of 38 psf (185 Kg/m2) or the commercial (non-residential) window wind pressure exceeds 60 psf (293 Kg/m2) or exceeds 90 psf (439 Kg/m2), utilize a higher AAMA designated window complying with the calculated wind pressure. Anti- Terrorism window systems (including connections) must meet the testing requirements of UFC 4-010-01 when tested in accordance with ASTM F1642.

Comply with ASTM E 2112 and with flashing and weather-resistive barrier manufacturers' recommendations to install windows in framed wall construction. Comply with window flashing details from BIA for masonry back-up and veneer walls. Engineer and install window cleaning access and anchorage to the exterior wall or roof for facilities over three stories tall without interior window cleaning

access from pivoting or tilting sash. Provide anchors in accordance with Occupational Safety and Health Administration (OSHA) standard 29 CFR Section 1910.66.

Windows must be provided with sills on the exterior and stools on the interior of the opening. Sills must be special shape or cut unit masonry or precast concrete in masonry exterior construction and extruded aluminum or aluminum-wrapped wood framing or formed metal in other construction. Positively slope sills away from windows. Window stools must be slate or solid polymer for commercial construction and painted wood for residential construction.

B202001 WINDOWS

Exterior windows must consist of fixed and operable sash used singly and in multiples. Provide operable sash in spaces occupied by people as a minimum. Include operating hardware, non-corroding framed metal screens for operable sash, and security grilles. Provide jamb support for larger windows where recommended by manufacturer. Metal windows with insulating glass must have thermally broken frames and sash. Provide thermally broken windows and window assemblies where separating conditioned and unconditioned spaces. Provide windows and window assemblies that bear an NFRC energy performance label and meet or exceed current EnergyStar requirements.

Provide glazing in exterior windows in accordance with section B202004 EXTERIOR GLAZING.

B202001 1.1 STANDARD WINDOW SYSTEMS

B202001 1.1.1 Steel Windows

Conform to SWI SWS. Solid hot-rolled steel shape welded frames and mullions. Provide chemically cleaned and primed galvanized frames with polysteel powder coat finish. Provide glazing beads, steel frame screens with aluminum mesh at operable sashes, hardware and locks, and glazing. Aluminum screens must comply with ANSI/SMA 1004.

B202001 1.1.2 Aluminum Windows

Conform to ANSI/AAMA/WDMA 101. Factory finish aluminum windows and provide with aluminum frame screens with aluminum mesh at operable sash, hardware and locks, and glazing. Aluminum screens must comply with ANSI/SMA 1004.

Exposed aluminum surfaces must be factory finished with an AA 45 anodic coating or an AAMA organic coating. Provide a minimum of architectural Class II anodized coating or a baked enamel finish conforming to AAMA 2604 for one- or two-family residential dwelling construction. Provide a minimum of architectural Class I anodized coating or a high-performance organic coating conforming to AAMA 2605 for all other construction. AAMA coatings must have a total dry film thickness of 1.2 mils.

B202001 1.1.3 Security Windows

Security windows delay forced entry into the building through the windows. In addition to meeting the requirements of AAMA 101, windows

designated "resistance to forced entry" must conform to the requirements of AAMA 1302.

B202002 STOREFRONTS

Provide one-story storefront system fabricated from formed and extruded aluminum and glass components for exterior use.

B202002 1.1 ALUMINUM-FRAMED STOREFRONTS

B202002 1.1.1 Performance Requirements

a. Structural Requirements, as measured in accordance with ANSI/ASTM E330: Wind loads for exterior assemblies must meet or exceed 25 psf (122 Kg/m2) acting inward and 25 psf (122 Kg/m2) acting outward. Design system to withstand this as a minimum and comply with design pressure established within the required ASCE 7 Wind Speed Calculations determined by the overall average opening within the project.

required in accordance with the requirements of this section and ot in direction normal to plane of wall when subjected to specified design pressures for spans up to and including 13'-6" must be limited to 1/175 of its clear span and for spans greater than 13'-6" deflection must be limited to 1/240 + 1/4" of its clear span, except that maximum deflection of members supporting plaster surfaces must not exceed 1/360 of its span.

c. Air Infiltration - Air leakage through fixed light areas of storefront must not exceed 0.06 cfm per square foot of surface area when tested in accordance with ASTM E283 at differential static pressure of 6.24 psf (33.84 Kg/m2).

d. Water Penetration - When tested in accordance with ASTM E 331, there must be no water penetration at a pressure of 15 psf (73 Kg/m2) of fixed area.

e. Water infiltration No uncontrolled leakage when tested in accordance with ASTM E331 at test pressure of 10 psf (48 Kg/m2) for system standard and capable of performing within the Design Pressure requirements derived from the ASCE 7 requirements.

f. Provide storefront framing and glazing assembly with an overall thermal transmittance value of not more than 0.40 BTU/hr x ft2 x deg F as determined according to NFRC 100. Provide a thermally broken storefront system where storefront occurs between conditioned and unconditioned spaces. A non-structural thermal break system is not acceptable.

B202002 1.1.2 Doors And Frames

Provide doors complete with frames, framing members, subframes, transoms, adjoining sidelights, adjoining window wall, trim, and accessories, as required for a complete installation. Anchors must be stainless steel. Weatherstripping must be Continuous wool pile, silicone treated, or type recommended by door manufacturer. See

B203008, EXTERIOR DOOR HARDWARE for hardware requirements.

B202002 1.1.3 Aluminum Alloy for Doors and Frames

ASTM B 221, Alloy 6063-T6 for extrusions. ASTM B 209, alloy and temper best suited for aluminum sheets and strips.

B202002 1.1.4 Fabrication

a. Aluminum Frames: Provide removable glass stops and glazing beads for frames accommodating fixed glass. Use countersunk stainless steel Phillips screws for exposed fastenings, and space not more than 12 inches (300 mm) o.c.. Mill joints in frame members to a hairline fit, reinforce, and secure mechanically.
b. Aluminum Doors: Doors must be medium or wide stile. Doors must be not less than 1-3/4 inches (44 mm) thick. Minimum wall thickness, 0.125 inch (3.175 mm), except beads and trim, 0.050 inch (1.27 mm). Bevel single-acting doors at lock, hinge, and meeting stile edges. Double-acting doors must have rounded edges at hinge stile, lock stile, and meeting stile edges.
c. Finishes: Provide exposed aluminum surfaces with factory finish of anodic coating conforming to AA45, Architectural Class I or an organic coating conforming to AAMA 2605 with a total dry film thickness of not less than 1.2 mils.

B202004 EXTERIOR GLAZING

Provide setting and sealing materials, stops and gaskets as recommended by the glass or acrylic sheet manufacturer.

Provide warranty for insulating glass units for a period of 10 years against development of material obstruction to vision (such as dust or film formation on the inner glass surfaces) caused by failure of the hermetic seal, other than through glass breakage. The Contractor is required to provide a glazing warranty for curtain wall glazing written directly to the Government.

Provide warranty for polycarbonate sheet glazing for a period of 5-years against breakage, coating delamination, and yellowing.

Glazing thickness indicated in the following paragraphs is the minimum acceptable thickness. Provide thicker glazing if required by the manufacturer for the given application.

B202004 1.1 GLASS

B202004 1.1.1 Clear Glass

Type I, Class 1 (clear), Quality q4 (A).

B202004 1.1.2 Heat-Absorbing Glass

ASTM 1036, Type I, Class 2 (heat absorbing and light reducing), Quality q3 (select), 1/4 inch (6 mm) thick, with a light transmittance of approximately 45 percent and total solar transmittance of not more than 50 percent for 1/4 inch (6 mm) thickness. Use warm color tint

for warm color frames and cool color tints for white and gray frames.

B202004 1.1.3 Wire Glass

Type II, Class 1, Form 1, Quality q8 Mesh m1 or Form 2, Quality q7, Finish f1, Mesh m1, 1/4 inch (6 mm) thick. Conform to NFPA 80. Glass for fire-rated windows must be Underwriters Laboratories (UL) listed and must be rated when tested in accordance with ASTM E 163.

B202004 1.1.4 Laminated Glass

ASTM 1172, fabricated from two pieces of Type I, Class 1, Quality q3 glass laminated together with a clear 0.030 inch (0.75 mm) thick polyvinyl butyral interlayer. The total thickness must be nominally 1/4 inch (6 mm). Laminated glass used for anti-terrorism window assemblies must be a minimum of 1/4 inch (6 mm) thickness.

B202004 1.1.5 Insulating Glass Units

Provide insulated glass using a combination of the interior and exterior glazing materials listed below filled with a thermal resistive gas. The air space must be sized to meet the thermal requirements below but not less than one half inch (12 mm) for non-residential construction and one quarter inch (6 mm) minimum for residential construction.

Provide active solar control glazing by using tinting, maximum thermal resistance, special coatings to meet Energy Star climate zone and window type requirements (including frames), and comply with the performance characteristics below. Provide an active low-emissivity coating on glass surface number 2 (the inside surface of the exterior glass pane).

If the building is located in a heat dominated climate zone, the facility is designed to utilize solar heat gain to augment the HVAC system, and the window overhang design prohibits excessive solar gain; a passive low-emissivity coating may be used to accommodate the design. Design occupied spaces adjoining passive low-emissivity coated glass for comfortable use of the space.

Provide two panes of glass separated by a dehydrated airspace and hermetically sealed. Dimensional tolerances must be as specified in IGMA TR-1200. The units must conform to ASTM E 773 and ASTM E 774, Class A. Provide primary seal, secondary seal, and spacers to eliminate moisture and hydrocarbon vapor transmission into airspace. Warranty insulating glass units against development of material obstruction to vision (such as dust, fogging, or film formation on the inner glass surfaces) caused by failure of the hermetic seal for a 10-year period following acceptance of the work.

The interior glass pane must be one of the following:

1. Typically ASTM C 1036, Type I, Class 1, Quality q4, minimum 1/4 inch (6 mm) thick;
2. ASTM C 1048, Grade B (fully tempered), Style I (uncoated), Type I, Class 1 (transparent), Quality q4, minimum 1/4 inch (6 mm)

thick when required by ANSI Z97.1 or possible human impact is anticipated;

3. ASTM C 1172, laminated glass as specified above, when required by antiterrorism requirements and code requirements for windborne debris.

The exterior glass pane must be one of the following:

1. Typically ASTM C 1036, Type I, Class 2 (tinted heat absorbing or reflective), Quality q4, minimum 1/4 inch (6 mm) thick;
2. ASTM C 1048, Grade B (fully tempered), Style I (uncoated), Type I, Class 2 (tinted heat absorbing or reflective), Quality q4, minimum 1/4 inch (6 mm) thick when required by ANSI Z97.1 or possible human impact is anticipated.

Insulating glass performance for active solar control using low-emissivity coatings:

1. Visible Light Transmission, 66% or lower

2. Outdoor Light Reflectance, 11% or greater

3. Solar Heat Gain Coefficient, .36 or lower

4. Winter U-Value, .35 Btu/square foot x hr x degree F or lower for residential construction and .29 Btu/square foot x hr x degree F or lower for all other types of construction.

B202004 1.1.6 Tempered Glass

ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated), Type I, Class 1 (transparent) or 2 (tinted heat absorbing, Quality q3, 1/4 inch (6 mm) thick.

B202004 1.1.7 Patterned Glass

ASTM 1036, Type II, Class 1 (translucent), Form 3 (patterned), Quality q7 (decorative), Finish f1 (patterned one side), Pattern p2 (geometric) 7/32 inch (5.55 mm) thick.

B202004 1.1.8 Spandrel Glass

ASTM C 1048, Kind HS or FT, Condition B (ceramic coated), Type I, Quality q5, 1/4 inch (6 mm) thick.

B202004 1.1.9 Spandrel Glass with Adhered Backing

ASTM C 1048, Kind HS or FT, Condition B (ceramic coated), Type I, Quality q5, 1/4 inch (6 mm) thick and must pass the fallout resistance test specified in ASTM C 1048.

B2030 EXTERIOR DOORS

Provide heavy duty insulated exterior steel doors and frames for service access. Door frames must be welded. Corner knockdown door frames are not permitted.

Use heavy-duty overhead holder and closer to protect doors from wind damage. Provide kickplates on the inside face of all exterior doors.

Weather-protect all exterior doors and related construction with low infiltration weatherstripping and sealants. Provide threshold with offset to stop water penetration while maintaining accessibility compliance.

Conform to the design criteria of ASCE 7.

See section B203008, EXTERIOR DOOR HARDWARE, for door hardware requirements. For all installations, provide a recessed key box (Knox Box) approximately 7 inches x 7 inches (175 mm x 175 mm) with 4-3/4 inches (120 mm) solid steel door at primary exterior entry for storage of keys and access cards accessible by the fire department.

B203001 SOLID DOORS

B203001 1.1 FIBERGLASS REINFORCED PLASTIC (FRP) DOORS

Hardware preparation must be in accordance with ANSI/BHMA A156.115. Doors must be hung in accordance with ASTM E2112.

B203001 1.1.1 FRP Doors

Provide door and frame components including, but not limited to, astragals, cores, faces, stiles, rails, heads, jambs, and internal reinforcement, which are FRP structural shapes manufactured by the pultrusion process. Ensure all structural shapes are composed of fiberglass reinforcement and resin in qualities, quantities, properties, arrangements and dimensions as necessary to meet the design requirements in accordance with ASCE 7, ICC/IBC and dimensions specified.

Ensure fiberglass reinforcements are a combination of continuous roving, continuous strand mat, and surfacing veil in sufficient quantities as needed by the application and/or physical properties required.

Verify resins are of isophthalic polyester with chemical formulation necessary for corrosion resistance, strength and other physical properties as required.

Provide documentation that all pultruded structural shapes are further protected from ultraviolet (UV) attack with:

a. Integral UV inhibitors within the resin.
b. Synthetic surfacing veil to help produce a resin rich surface.

UV resistant coating for outdoor exposures.

B203001 1.1.2 Accessories

a. Louvers must comply with SDI 111-C, must be stationary, sight-proof type. Use lightproof louvers if function of room

requires darkness. Louver frames must be 20-gage steel with louver blades minimum 24 gage. Cutouts for door lights and louvers are to be manufactured and not field fabricated. Cutouts are to be totally enclosed by internal pultruded FRP stiles and rails as specified and incorporated into the door subframe with the opening completely fused to both door faces.

b. Astragals: Provide an integral heavy pultruded FRP astragal on the stile edge of the inactive leaf for double doors of the same materials as specified for door stiles and rails.

c. Moldings: Provide moldings around glass of exterior doors and louvers. Provide non-removable moldings on outside of exterior doors. Secure inside moldings to stationary moldings, or provide snap-on moldings. Muntins must interlock at intersections and must be fitted and welded to stationary moldings.

B203001 1.1.3 Standard FRP Frames

Provide FRP Door Frame utilizing a high-modulus pultruded structural FRP shape. Fabricate pultruded frame with a wall thickness of not less than 5 mm 3/16-inch. Frames are to be one-piece factory constructed with molded stop. Jambs and header to utilize miter corner connections chemically welded with FRP material ground for a visibly smooth frame face. Post and beam or mechanical fastened corners and joints are not acceptable. Provide sizes and shapes as detailed on the approved drawings.

Provide hardware reinforcement connections utilizing a chemical weld with FRP material at required locations. A minimum pull-out force strength of 1,100 lbs per screw is required for all hardware locations.

B203001 1.1.4 Anchors

Provide anchorage devices and fasteners where necessary for fastening fabricated FRP door frame to the adjacent construction-in-place as recommended by the FRP frame manufacturer.

B203001 1.1.5 Finishes

Ensure all finished surfaces of FRP items and fabrications are smooth, resin-rich, free of voids and without dry spots, cracks, and un-reinforced areas. Completely cover all glass fibers with resin to protect against their exposure due to wear or weathering. All stiles, rails, heads, jambs, and internal reinforcement are to be integrally pigmented.

B203001 1.2 STEEL DOORS

Provide hardware preparation in accordance with American National Standards Institute/Builders Hardware Manufacturers Association (ANSI/BHMA) A156.115. Doors must be hung in accordance with ASTM E2112.

B203001 1.2.1 Steel Doors

Steel doors must be American National Standards Institute/Steel Door Institute (ANSI/SDI) A250.8, Level 4, exterior, with a physical

performance level of, Model 1 or 2.

Doors may be specified to be insulated. Door selection must be specified in the project program according to the following:

a. Doors shall be insulated

B203001 1.2.2 Insulation Cores

Provide insulated cores of type specified, and provide an apparent U-factor of .48 in accordance with SDI 113 and must conform to:

a. Rigid Polyurethane Foam: ASTM C591, Type 1 or 2, foamed-in-place or in board form, with oxygen index of not less than 22 percent when tested in accordance with ASTM D2863; or
b. Rigid Polystyrene Foam Board: ASTM C578, Type I or II; or
c. Mineral board: ASTM C612, Type I.

B203001 1.2.3 Accessories

a. Provide stationary, sight-proof type louvers which comply with SDI 111-C. Use lightproof louvers if function of room requires darkness. Louver frames must be 20-gage steel with louver blades minimum 24 gage.
b. Astragals: For pairs of exterior steel doors that will not have aluminum astragals or removable mullions, provide overlapping steel astragals with the doors.
c. Moldings: Provide moldings around glass of exterior doors and louvers. Provide non-removable moldings on outside of exterior doors. Secure inside moldings to stationary moldings, or provide snap-on moldings. Muntins must interlock at intersections and must be fitted and welded to stationary moldings.

B203001 1.2.4 Standard Steel Frames

ANSI/SDI A250.8. Form frames with welded corners for installation in exterior walls. Form stops and beads of 20 gage steel. Set frames in accordance with ASTM A250.11.

B203001 1.2.5 Anchors

Anchor all frames with a minimum of three jamb anchors and base steel anchors per frame, zinc-coated or painted with rust-inhibitive paint, not lighter than 18 gage. Mortar infill frames in masonry walls, and infill with gypsum board compound at each jamb anchor in metal frame walls. Only use surface exposed bolted anchors in concrete walls.

B203001 1.2.6 Finishes

a. Exterior Doors, Factory-Primed and Field Painted Finish – Doors and frames must be factory primed with a rust inhibitive coating as specified in ANSI/SDI A250.8. Factory prime doors on six sides of the door. Manufacturer's primer and field painting must be compatible with finish system in the paragraph "EXTERIOR PAINTING AND SPECIAL COATINGS".

b. Exterior Doors Galvanized Finish – Must be Commercial Quality, Coating Class A, zinc coating in accordance with ASTM A 591 when facility is located further than 300 feet (91 meters) from the ocean. When facility is located within 300 feet (91 meters) of the ocean, provide G60 galvanized coating in accordance with ASTM A 924/A 924M and ASTM A 653/A 653M.

B203002 GLAZED DOORS

B203002 1.1 ALUMINUM GLAZED DOORS

See B202002 STOREFRONTS, paragraph titled, "Doors and Frames."

B203004 OVERHEAD ROLL-UP AND OVERHEAD SECTIONAL DOORS

Refer to RFP PART 3, Chapter 6 for project specific exterior overhead sectional and roll-up doors system requirements. Do not use exterior roll-up doors as an entrance into conditioned spaces.

B203004 1.1 OVERHEAD ROLL-UP DOORS

Provide overhead doors in accordance with Door and Access Systems Manufacturers Association International (DASMA) requirements. Overhead roll-up doors must conform to ANSI/ DASMA 207. Provide overhead roll-up doors with minimum 22 gage thermal insulated slats, however use door weight, pressure, and width to determine if a heavier gauge slat is required. Electric operators must have protected 3-button switches conforming to National Electrical Manufacturers Association (NEMA) MG 1, NEMA ICS 1, and NEMA ICS 2. Galvanize door and sheet metal components in accordance with ASTM A653. Apply painted coat required in RFP Part 3, Chapter 6, over the galvanizing to all components directly exposed to the weather.

B203004 1.2 OVERHEAD SECTIONAL DOORS

Provide overhead doors in accordance with Door and Access Systems Manufacturers Association International (DASMA) requirements. Overhead sectional doors must conform to ANSI/DASMA 102 Completely close the door opening in the closed position and make the full width and height of the door opening available for use in the open position. Provide a 3 inch (75 mm) track when required by manufacturers standards, or design pressure and forces on the door, or if the door is equal to or greater than 16 feet (4877 mm) high or wide. Design door storage to allow full use of the space around the door for the activities required in the space. Provide a minimum of 16 inches (400 mm) of headroom for 2 inch (50 mm) tracks, 21 inches (525 mm) of headroom for 3 inch (75 mm) tracks, or a high lift type or vertical lift type. If motorized, provide limit switches to automatically stop doors at the fully open and closed positions. Provide readily adjustable limit switch positions.

Doors must remain operable and undamaged after conclusion of tests conducted in accordance with ASTM E 330 using the design wind load. Form steel door sections of hot-dipped galvanized steel not lighter than 16 gage using a flush surface without ribs or grooves. Sections must be not less than 1 3/4 inches (44.50 mm) minimum panel thickness. Provide maximum insulation value to insulate doors as required to meet energy requirements. Cover interior of door sections with steel sheets of not lighter than 24 gauge

to completely enclose the insulating material. Provide galvanized steel tracks not lighter than 14 gauge for 2 inch (50 mm) tracks and not lighter than 12 gauge for 3 inch (75 mm) track. Provide a positive locking device and cylinder lock with two keys on manually operated doors. Form aluminum door panels of 0.050 inch (1.3 mm) sheet aluminum and styles and rails of 6063-T6 aluminum. Galvanize door and steel sheet metal components in accordance with ASTM A653.

B203004 1.3 OVERHEAD DOOR FINISH

Finish steel door and components with hot dipped galvanized coating and apply a baked-on primer and topcoat painted finish. If powder coat finish is required in RFP Part 3, Chapter 6, painted system must conform to the following requirements;

a. Outgas Forgiving Primer

b. Film Thickness per ISO 2360 - 2.5-3.5 mils (60-80 Î¼m)

c. Mandrel Bending Test per ASTM D522 - 1/8 inches (3mm)

d. Impact Test per ASTM D2794 - Up to 80 in/lb. Cracking at the perimeter of the concave area

but no cracking pick off

e. Pencil Hardness per ASTM D3363 - 2H minimum.

f. Color Change per ASTM D2244 - â‰¤Î”Îµ 5.0 (Hunter)

g. Gloss Retention per ASTM D523 - >80%

h. Salt Spray Test per ASTM B117 - 3000 hours

B203008 EXTERIOR DOOR HARDWARE

Provide the services of an Architectural Hardware Consultant (AHC), Certified Door Consultant (CDC), or an Electrified Hardware Consultant (EHC) to assist the Designer of Record in preparation of the door hardware schedule and product selection. The hardware consultant must sign and seal the door hardware construction submittal. Provide, as far as possible, door hardware of one manufacturer's make. All hardware must be clearly and permanently marked by the manufacturer where it will be visible after installation.

B203008 1.1 HINGES

BHMA A156.1, size to match door size, but in no case less than 4-1/2 x 4-1/2 inches (114 mm x 114 mm), with non-removable pin and anti-friction bearing hinges. Use two hinges for doors 60 inches (1500 mm) or less in height and one additional hinge for each additional 30 inches (750 mm), or fraction thereof, in door height.

B203008 1.2 PIVOTS

BHMA A156.4.

B203008 1.3 LOCKS AND LATCHES

Commercial (all construction except family housing) buildings locks and latches must be BHMA A 156.13, Series 1000, Operational Grade 1, Security Grade 2 for exterior building entrances and other high-use doors not requiring exit devices. Use BHMA A 156.2, Series 4000, Grade 1 for all Commercial buildings locks and latches not using Series 1000 hardware.

B203008 1.4 CARD KEY SYSTEM

Where required, provide card key type access units. Provide lithium battery powered, magnetic stripe keycard locksets that are ANSI/BHMA A156.13, Series 1000, Grade 1, mortise or ANSI/BHMA A156.2, Series 4000, Grade 1, cylindrical locks, tamper resistant, UL listed with 1 inch (25 mm) throw deadbolt, 3/4-inch (19 mm) throw latch bolt, auxiliary deadlocking latch, and 2-3/4 inch (68.75 mm) backset. The latch bolt and the dead bolt must be operated simultaneously by rotating inside lever. Locks with mechanical override lock cylinders are not acceptable. Locks must be operated only by a correctly encoded keycard. Use of a newly issued keycard automatically re-keys the lock and voids the previous keycard. The lock must re-lock immediately after outside lever is turned and latch retracted. Locks must have memory that is capable of recording up to 140 entries into each room, identification of the keycard used to access the room, the date and time of entry. Entry information of the lock must be retrievable by a data key that can be inserted into the lock and then taken to the front desk printer to display information. Other components that are required for this system at the front desk are a personal or laptop computer, printer and encoder to program each key.

For exit device locks with card key access, provide mortise type, narrow stile exit devices with 24 volt DC, solenoid option for card key exterior access at aluminum storefront doors. Provide mortise type exit devices with 24 volt DC, solenoid option with alarm and remote exterior access for card key access at insulated hollow metal doors. The alarmed exit device must sound when exiting only.

Provide a card key system capable of accepting a minimum of 12 keycard access levels, security auditing and computer interfacing with existing installations management system. Provide a single point of contact customer service representative accessible by telephone with a 10-digit telephone number without additional dialing hierarchies except that a maximum 4-digit extension is permissible. On-site service must be provided within 3 hours from request within the first 12 months of occupancy. Provide a 5-year parts and labor warranty.

B203008 1.5 EXIT DEVICES

BHMA A 156.3, Grade 1. Provide on exit doors if it is anticipated that more than 50 people may use a particular door in an emergency exit situation. Touch bars must be provided in lieu of conventional crossbars and arms. Use manufacturer's integral touch bars in aluminum storefront doors.

B203008 1.6 EXIT LOCKS WITH ALARM

BHMA A 156.5.

B203008 1.7 CYLINDERS AND CORES

If required, provide cylinders and cores for new locks, including locks provided under other sections of this specification. Cylinders and cores must have seven pin tumblers. Cylinders must be products of one manufacturer, and cores must be the products of one manufacturer. Rim cylinders, mortise cylinders, and knobs of bored locksets must have interchangeable cores, which are removable by special control keys. Stamp each interchangeable core with a key control symbol in a concealed place on the core.

B203008 1.8 KEYING SYSTEM

Provide a master key system for the facility, unless more than one tenant/tenant command must reside in a facility, or a grand master keying system, or great, grand master keying system if multiple tenants or buildings are required. The keying system must be an extension of the existing keying system for additions to existing facilities. The keying system must allow for construction interchangeable cores when subcontractors require keys during construction. If required, provide a key cabinet.

The Contractor must coordinate a keying system meeting. The Contractor's Project Manager, Superintendent, Hardware Subcontractor, Electrical Subcontractor (if keying hardware is electric), Designer of Record, Contracting Officer, Public Works Base Hardware Specialist, and the Using Activity must attend this meeting to establish the keying system for the project. This meeting is intended to identify base limitations, the necessary security, and access control within the facility. The meeting must produce a marked up copy of the floor plan indicating the doors to receive locks and the doors to be keyed together, and any master keying or grand master keying.

B203008 1.9 KEYS

Furnish one file key, one duplicate key and one working key for each key exchange and for each master and grand master keying system.

B203008 1.10 LOCK TRIM

Cast, forged or heavy wrought construction and commercial plain in design.

B203008 1.10.1 Knobs and Roses

Knobs and roses must meet test requirements of BHMA A 156.2 and BHMA A 156.13.

B203008 1.10.2 Lever Handles

Provide lever handles in lieu of knobs as required by DoD Architectural Barriers Act (ABA) Standards. Lever handles must meet the test requirements of BHMA A 156.13 for mortise locks. All lever handles (mortise or cylinder) must be the freewheeling type.

B203008 1.11 DOOR BOLTS

BHMA A 156.16, Grade 1. Provide two flush bolts for each inactive leaf of

a pair of doors.

B203008 1.12 CLOSERS

BHMA A 156.4, Series C02000, Grade 1, with PT 4C, 1-1/2 inch piston, heavy duty forged arm, full size case. Provide closers for all exterior doors, fire-rated doors, corridor doors, stairway doors, and secure area doors, for non-residential (commercial) construction, as a minimum.

B203008 1.13 OVERHEAD HOLDERS

BHMA A 156.8, Grade 1. Provide for exterior doors for non-residential (commercial) construction.

B203008 1.14 DOOR PROTECTION PLATES

Kick plates must conform to BHMA A 156.6. Provide kick plates on all doors with closers and all doors leading to corridors or circulation spaces. Provide armor plates on all doors to receive cart traffic. Provide mop plates on all doors in rooms with a mopable floor finish that do not have kick plates.

B203008 1.15 DOOR STOPS AND SILENCERS

BHMA A 156.16. Provide silencers, Type L03011, three per single door and four per double door, for doors in hollow metal frames.

B203008 1.16 THRESHOLDS

BHMA A 156.21. Provide thresholds with offset to stop water infiltration, while maintaining accessibility requirements.

B203008 1.17 WEATHERSTRIPPING

BHMA A 156.22. Air leakage of weatherstripped doors must not exceed 0.5 CFM of air per square foot of door for residential doors, and 1.25 CFM for non-residential doors (unless a more restrictive infiltration level is specified).

B203008 1.18 RAIN DRIPS

For all exterior doors that open to the outside, where the door swing area is not covered by an overhang, provide top and bottom rain drips complying with ANSI R3Y535 as a minimum. Greater weather sealing may be required by the geographic location of the project.

B203008 1.19 FINISHES

Provide the following hardware finish systems, and match the interior door hardware:

a. BHMA A156.18. Hardware must have BHMA 630 finish (satin stainless steel), unless specified otherwise. Provide items not manufactured in stainless steel in BHMA 626 finish (satin chromium plated) over brass or bronze, except surface door closers which must have aluminum paint finish, and except steel hinges which must have BHMA 652 finish

(satin chromium plated). Hinges for exterior doors must be stainless steel with BHMA 630 finish or chromium plated brass or bronze with BHMA 626 finish. Exit devices may be provided in BHMA 626 finish in lieu of BHMA 630 finish. Exposed parts of concealed closers must have finish to match lock and door trim. Hardware for aluminum doors must be finished to match the doors.

SECTION B30

ROOFING
09/22

B30 GENERAL

RFP Part 3 including the Engineering System Requirements (ESR) provide project specific requirements. The RFP Part 4, Performance Technical Sections (PTS) provide generalized technical requirements that apply to multiple facility types and include more requirements than are applicable to any one project. Therefore, only the RFP Part 4 requirements that apply to the project and further define the RFP Part 3 project specific requirements are required.

B30 1.1 DESIGN GUIDANCE

Provide the design and installation in accordance with the following references. This Performance Technical Specification (PTS) adds clarification to the fundamental requirements contained in the following Government Standards. The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification*.

Industry standards, codes, and Government standards that are referenced in the section text that are not found in the Unified Master Reference List (UMRL) in the Federal Facility Criteria (FFC) at the Whole Building Design Guide (WBDG) website, are listed below for basic designation identification. Comply with the required and advisory portions of the current edition of the standard at the time of contract award.

B30 1.1.1 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s):UFC 3-101-01 ArchitectureUFC 3-110-03 Roofing)
UFC 1-200-02	High Performance and Sustainable Building Requirements

B30 1.1.2 Design Requirements

Wind Uplift Resistance: Determine the required wind uplift resistance based on American Society of Civil Engineers (ASCE) 7 wind loading calculations or applicable building code requirements and UFC 3-301-01 *Architecture*and UFC 3-110-03 *Roofing*. The specified Factory Mutual (FM) rating incorporates a safety factor of 2 over the maximum calculated uplift pressure. Therefore, a FM rating of 1-90

correlates to a maximum uplift calculation of 2.2 kPa, 45 psf. When a rated system is specified, ensure the specified roof system is capable of meeting the wind uplift resistance specified. Where non-rated systems may be allowed and used, delineate calculated values in the roof specification or drawings. Utilize independently tested and rated roof systems, such as Factory Mutual (FM), Underwriters Laboratory (UL), and Single Ply Roofing Industry (SPRI).

The complete roof system assembly must be rated and installed to resist wind loads calculated in accordance with ASCE 7 and validated by uplift resistance testing in accordance with Factory Mutual (FM) test procedures. Non-rated systems must not be installed, except as approved by the Contracting Officer. Submit licensed engineer's wind uplift calculations and substantiating data to validate any non-rated roof system.

B30 1.2 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Provide verification of satisfactory roofing system performance via Performance Verification Testing, and by field inspection as detailed in this section of the RFP. All performance and acceptance testing including final/warranty inspections must be witnessed by the Contracting Officer on all significant roof projects.

A significant roof is defined as a single or group of buildings with greater than 15,000 square feet (1,400 m2) of roof area; or a roof with area that is allocated to energy generating equipment such as solar hot water panels or photovoltaic panels; or where building equipment (excluding HVAC), use, or safety causes multiple roof penetrations.

B30 1.2.1 Pre-Roofing Design Conference

If the project roof meets the definition of a significant roof above, provide a Pre-Roofing Design Conference. Schedule this conference prior to the roof design and roof layout of the facility. Required attendees include the Designer of Record (DOR), Design Quality Control (DQC) Manager, Roof Design Assurance Consultant (if applicable), Commissioning Authority, and Subcontractors directly responsible for installing the roof and equipment that will be mounted on the roof. Discuss and coordinate the following as a minimum:

a. Renewable energy systems to be mounted on the roof and interface with building systems and utilities,
b. Allocation of space on the roof for different functions,
c. Impact of renewable energy systems and building orientation to the suns path,
d. Waterproofing, flashing, and future reroofing considerations of the facility resulting from renewable energy systems inclusion on the roof,
e. Measures taken to eliminate penetration of the roof membrane. National Roofing Contractors Association (NRCA) roof details proposed for each necessary penetration,
f. Structural requirements to support roof mounted equipment,
g. Aesthetic impact of roof mounted equipment on the facility and measures taken to mitigate negative appearances of equipment.
h. Maintenance and Commissioning requirements of the roof and roof

mounted equipment to facilitate final testing and provide proper access and roof membrane protection.

B30 1.2.2 Pre-Roofing Conference

Prior to beginning roofing work, hold a Pre-Roofing Conference with the Contracting Officer. Required attendees include personnel directly responsible for the roofing systems design and construction, DQC Manager, Commissioning Authority, as well as the roofing manufacturer's technical representative, and Roof Design Consultant (if applicable). At this time the Contractor will address any conflicts between the proposed roofing system, the design documents, and the scheduling of work / workers (trades) to assure a watertight roofing installation. Resolutions will be obtained and documented in writing prior to the start of roofing work. A quality assurance/quality control plan must also be established at this time, inclusive of the roofing manufacturer's recommended testing and inspections procedures, and in accordance with industry standard guidelines.

Contractor must provide the following additional information at the pre-roofing conference: Procedure for the roof manufacturer’s technical representative's onsite inspection and acceptance of the roofing substrate, roof insulation, and installation of the roofing in accordance with the roof system warranty, the name of the manufacturer's technical representatives, the frequency of the onsite visits, copies of the roof status reports from the technical representatives to the roof manufacturer, and pertinent structural details to the roofing system.

B30 1.2.3 Roof Design Assurance

If the project roof meets the definition of a significant roof above, the Contractor must utilize the services of a Registered Roof Consultant (RRC) certified by the Roof Consultant Institute, or a Registered Professional Architect or Engineer who specializes in roofing, to approve the roof design. The roof consultant must derive his or her principal income from roofing design on the quality control staff of the Design or Design-Build team. The roof consultant must verify in writing that the design for the project is in accordance with the current edition of NRCA *Roofing and Waterproofing Manual*, UFC 3-110-03, the RFP, and standard industry practices and building codes.

B30 1.2.4 Tests for Surface Dryness

Prior to application of roofing materials, perform surface dryness tests in presence of DOR. Asphalt of 350 to 400 degrees F (177 to 204 degrees C) must not foam upon contact with substrate. After foaming test is performed, test for strippability (adherence).

B30 1.2.5 Quality Control Program

Establish a quality control program to assure adherence to NRCA recommended Quality Control Guidelines for the Application of Roofing Systems and other specified application requirements. Compliance

with Part 2 Section 01 45 00.05 20, *Design and Construction Quality Control*, is required.

B30 1.3 DESIGN SUBMITTALS

Provide design submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, Facilities Criteria (FC) 1-300-09N, *Navy and Marine CorpsDesign Procedures,*UFC 3-101-01, *Architecture* and UFC 3-110-03, *Roofing*.

B30 1.4 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*. In addition to the Z10 requirements, the Designer of Record (DOR) must approve the following submittals as a minimum:

Test reports, color samples, certificates of conformance, warranties, close out documentation, and manufacturer's instructions for application and installation on all products used on the roof. Products used on the roof consist of but are not limited to structural deck, insulation, membrane or panels, Standing Seam Metal Roofing (SSMR), flashing, fasteners, nailers, accessories and equipment support curbs or equipment support stands for solar equipment, equipment roof plan, maintenance access and paths.

B3010 ROOF COVERINGS

Roof coverings must comply with the requirements of UFC 3-110-03, *Roofing*, and NRCA, *Roofing and Waterproofing Manual*found at http://www.nrca.net/rp/technical/manual/manual.aspx as the primary NAVFAC roofing criteria. Determine wind uplift using wind speed in accordance with ASCE-7.

Submit the INFORMATION CARD (see "Form 1" at the end of this section) Provide a typewritten card, laminated in plastic and framed in a weather-tight frame, or a photoengraved 0.032-inch (0.81 mm) thick aluminum card for the roof. This card must be a minimum size of 8 1/2 x 11 inch (216 x 280 mm) and contain information listed in the attached Form 1. Install the card where directed. Furnish framed card and a duplicate card to the Designer of Record.

B301001 STEEP SLOPE ROOF SYSTEMS

B301001 1.1 METAL ROOF PANELS (ARCHITECTURAL STANDING SEAM METAL ROOFS ON SUPPORTED SUBSTRATE)

B301001 1.1.1 Manufactured Sheet Metal Roofing

Provide galvanized steel or aluminum-zinc coated steel or aluminum panels formed at the manufacturing plant and conditioned for flatness. Determine panel thickness by the requirements of NRCA, *Roofing and Waterproofing Manual*, but not less than 24 gauge for panels less than 16 inches wide (400 mm), and 22 gauge for panels 16 inches (400 mm) wide or greater. All panels greater than 12 inches (300 mm) wide must have preformed reinforcing ribs or embossed for stiffening. The minimum gauge for aluminum panels must be 20-gauge, .032 inch thick

(.8 mm thick) or greater. Roofing design must meet deflection and wind load requirements per building code.

The SSMR system covered under this specification must include the entire roofing system; the standing seam metal roof panels, fasteners, connectors, roof securement components, and assemblies tested and approved in accordance with ASTM E 1592. In addition, the system must consist of panel finishes, slip sheet, insulation, vapor retarder, all accessories, components, and trim and all connections with roof panels. This includes roof penetration items such as vents, curbs, skylights; interior or exterior gutters and downspouts; eaves, ridge, hip, valley, rake, gable, wall, or other roof system flashings installed and any other components specified within this contract to provide a weathertight roof system.

a. Provide inverted "L" Standing Seam shape roofing panels.
b. Panel Protection - Treat exposed cut edges with compatible coating comparable to the factory applied coating system for corrosion protection.
c. Sealants - Provide non-curing, non-skinning butyl based sealants and tapes for concealed locations such as within laps and under eaves. Provide polyurethane and curing butyl elastomeric sealants for exposed locations such as along top edge of surface mounted counter flashings.
d. Factory Color Finish - Provide factory applied, baked coating to the exterior and interior of metal wall panels and metal accessories. Provide exterior finish top coat of 70 percent polyvinylidene fluoride resin with not less than 0.8 mil dry film thickness. Provide exterior primer standard with panel manufacturer with not less than 0.8 mil dry film thickness. Interior finish must consist of 0.5 mil dry film thick backer coat if permanently concealed from view by construction or the same coating and dry film thickness as the exterior coating if the panel interior side will be exposed. Provide factory-applied clear 70 percent polyvinylidene fluoride (PVF), 0.8 mil top coat and edge coating on all factory-cut or unfinished panel edges for projects within 300 feet (91 meters) of the ocean or industrial environments.
e. Warranty - Furnish manufacturer's no dollar limit materials and workmanship warranty for the roofing system. The warranty period must not be less than 20 years from the date of Government acceptance of the work. The warranty must be issued directly to the Government. The warranty must provide that if within the warranty period the metal roofing system becomes non-watertight or shows evidence of corrosion, perforation, peeling paint, rupture or excess weathering due to deterioration of the roofing system resulting from defective materials or workmanship the repair or replacement of the defective materials and correction of the defective workmanship must be the responsibility of the roofing system manufacturer. Repairs that become necessary because of defective materials and workmanship while roofing is under warranty must be performed within 7 days after notification, unless additional time is approved by the Contracting Officer. Failure to perform repairs within the specified period of time will constitute grounds for having the repairs performed by others and the cost billed to the manufacturer. Provide a 2-year

contractor installation warranty. Coating must not show a color change greater than 5 NBS color units in accordance with ASTM D2244, and not show chalking in excess of 10 in accordance with ASTM D4214.

f. Wind Uplift - Metal roofing systems must be designed and attached to resist wind uplift pressures calculated in accordance with ASCE 7. Uplift resistance must be validated by applicable Factory Mutual (FM), Underwriters Laboratories (UL), or ASTM uplift resistance test procedures.

B301001 1.1.2 Metal Roof Design Requirements

Design the SSMR system as a complete system. Roof panels, components, transitions, accessories, and assemblies must be supplied by the same roofing system manufacturer. Provide to the DOR a design analysis signed by a Registered Professional Engineer employed by the SSMR manufacturer. The design analysis must include a list of the design loads, and complete calculations for the roofing system and its components; valley designs, gutter/downspout calculations, screw pullout test results, and indicate how expected thermal movements are accommodated.

B301001 1.1.3 Accessories

Provide other sheet metal flashings, trim moldings, closure strips, caps and other preformed metal panel accessories, of the same material, thickness and finish as panels, except accessories that are concealed after installation, and are aluminum or zinc-coated steel may be provided unfinished. Provide molded closure strips of closed-cell or solid-cell synthetic rubber, neoprene, or polyvinyl chloride premolded to match configurations of preformed metal panels. All accessories must be manufactured or approved by the roof panel manufacturer.

B301001 1.1.4 Fasteners

Provide concealed fasteners for attaching panels to structural supports and to adjoining panels as approved and in accordance with printed manufacturer's recommendations.

B301001 1.1.5 Field Quality Control

Install in accordance with the approved manufacturer's erection instructions, shop drawings, and diagrams. Panels must be in full and firm contact with attachment clips. Where prefinished panels are cut in the field, or where any of the factory applied coverings or coatings are abraded or damaged in handling or installation, they must, after necessary repairs have been made with material of the same color as the weather coating, be approved before being installed. Seal openings through panels. Correct defects or errors in the materials. Replace materials which cannot be corrected in an approved manner with nondefective materials. Provide molded closure strips where necessary to provide weathertight construction. Use shims as required to ensure attachment clip line is true. Use a spacing gage at each row of panels to ensure that panel width is not stretched or shortened. Provide 30-pound layer of asphalt-saturated

felt placed perpendicular to roof slope, covered by a slip sheet. Overlap side and end laps 75 mm 3 inches, offset seams in building paper with seams in felt.

Apply roofing panels with the standing seams parallel to the slope of the roof. Provide roofing panels in longest practical lengths from ridge to eaves (top to eaves on shed roofs), with no transverse joints except at the junction of ventilators, curbs, and similar openings. Install flashing to assure positive water drainage away from roof penetrations. Locate panel end laps such that fasteners do not engage supports or otherwise restrain the longitudinal thermal movement of panels. Attach panels to the structure with concealed clips incorporated into panel seams. Clip attachment must allow roof to move independently of the structure, except at fixed points as necessary.

B301003 ROOF INSULATION & FILL

Coordinate the insulation system with the mechanical design to suit the energy requirements of the facility.

B301003 1.1 MINERAL FIBER BLANKET INSULATION

This paragraph covers the requirements for mineral fiber blanket thermal insulation in attics and above ceilings.

B301003 1.1.1 Products

a. Blanket Insulation - ASTM C 665, Type I, II, or III, as appropriate for the installation, Class A, membrane-faced surface with a flame spread of 25 or less; and a smoke developed rating of 150 or less when tested in accordance with ASTM E 84. Indicate insulation R-values on the design drawings.
b. Blocking – Treated wood, metal, un-faced mineral fiber blankets in accordance with ASTM C665, Type I. Blocking around chimneys and other heat producing devices must be non-combustible and meet the requirements of ASTM E 136.
c. Vapor Retarder - 6 mil (minimum) thick polyethylene sheeting conforming to ASTM D 4397, with a water permeance value of 1 perm or less when tested according with ASTM E 96.

B301003 1.2 ROOF AND DECK INSULATION

This paragraph covers the requirements for insulation materials used below metal roofing systems.

B301003 1.2.1 Insulation Types

Roof insulation must have an R-value determined in accordance with American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) Standard 90.1 and meet project energy goals and be one or an assembly of a maximum of three of the following materials and compatible with attachment methods for the specified insulation and metal roof system: Polyisocyanurate Board – ASTM C 1289, with a minimum compressive strength of 138 kPa (20 psi), unless overlaid with another board with a comparable or greater compressive strength.

Use insulation facer as recommended by the roofing material manufacturer. Board size is restricted to 4' by 4' when applied in direct contact with concrete deck.

B301003 1.2.2 Glass Mat Gypsum Roof Board

ASTM C 1177, with a 0 Flame Spread and 0 Smoke Developed when tested in accordance with ASTM E 84.

B301003 1.2.3 Underlayment

a. Asphalt-Saturated Felt Base Sheet for Single Layer Application - ASTM D 4869, Type II or ASTM D 226, Type II (30 pounds).
b. Polymer-Modified Self-Adhering Bitumen Sheet, 40 mil (1.1 mm) minimum thickness. Provide at roof perimeter, valley and roof penetration locations as a minimum.

B301003 1.2.4 Seal at Penetrations

Provide pre-manufactured flashing components for use in roofing applications. Seal laps and penetrations to prevent moisture vapor penetration. Adhesives, sealants, prefabricated components and spray foam products may be required.

B301003 1.2.5 Fasteners

Fasteners must be flat, round or hexagonal steel (not less than 1-3/8"(35 mm) diameter) and 28 gage, or plastic plates (not less than 3 inches (75 mm) in diameter).

Fasteners in lightweight cellular concrete decks must penetrate at least 1 inch (25 mm) but not more than 1-1/2 inches (32 mm) into the deck. Withdrawal resistance from lightweight cellular concrete deck must not be less than 40 lbs.(18 kg) each, or 120 lbs. (54 kg) each in metal deck.

Fasteners in steel decks must be hardened fasteners or screws conforming to FM A/S4470 and listed in FM P7825 for Class I roof deck construction.

Fasteners must be place to withstand an uplift pressure required by the project program in the field of the roof and FM Loss Prevention Data Sheets (LPDS) 1-49 for perimeter component and flashing attachment.

Roofing Nails - Provide corrosion resistant ring shank nails of sufficient length to penetrate a minimum of 1 inch (25 mm) into wood nailers or so as to provide appropriate embedment in substrate below. Fasteners must conform to FM A/S4470, and be placed to withstand an uplift pressure of 90 psf (4.3 kPa) conforming to FM P7825, and FM 1-49 for perimeter fasteners.

B301003 1.2.6 Wood Nailers

Wood nailers must be pressure-preservative-treated in accordance with

AWPA M2 Standards, permanently marked or branded, and installed flush with the top of the adjacent insulation board. Separate treated wood nailers from roofing metals with underlayment.

B301003 1.2.6.1 Fasteners

Provide stainless steel, double hot-dipped galvanized or other corrosion resistant fasteners recommended by the treatment manufacturer for use with treated wood.

B301004 FLASHINGS & TRIM

B301004 1.1 FLASHING AND SHEET METAL

This paragraph covers the requirements for flashing and sheet metal work including scuppers, splash pans, and sheet metal roofing. Provide flashing and sheet metal in accordance with roof manufacturer's printed installation instructions and in compliance with NRCA and SMACNA recommendations.

B301004 1.1.1 Materials

Furnish sheet metal items in minimum 8 to 10 foot (2.44 to 3.05 meter) lengths. Sheet metal items include the following: gutters, including hangers; downspouts; counter-flashings; gravel stops and fascias; cap, valley, stepped, base and eave flashings and related accessories.

a. Provide flashing and trim in same materials and finish as roof panels.
b. Fasteners - Fasteners must be of the same or compatible metal with the item being fastened. Stainless steel fasteners must be used to fasten dissimilar materials.

B301004 1.1.2 Field Quality Control

Fabrication and installation of sheet metal items must be as follows:

a. Install work with watertight and hairline joints, without waves, warps, buckles, fastening stresses, or distortion, allowing for expansion and contraction.
b. Make surfaces to receive sheet metal plumb and true, clean, even, smooth, dry and free of defects and projections that could affect the application.
c. Provide sheet metal flashing in angles formed where roof decks abut walls, curbs, ventilators, pipes, or other vertical surfaces and wherever indicated and necessary to make the work watertight.
d. Provide prefabricated inside and outside corners at all sheet metal intersection pieces. Minimum leg length must be 12 inches (300 mm), maximum length must be 18 inches (450 mm).
e. Fabricate sheet metal to conform to the contours of surfaces to which applied.
f. All sheet metal cap flashings must have waterproof membrane underlayment installed behind or below the metal components.
g. Provide conforming sheet metal closures at all flashing termination conditions.
h. Provide fastenings and accessories as required to provide a

securely attached, watertight construction. Cleats must be a minimum of one gage heavier than the component to be attached.

i. Where sheet metal components are to be embedded in the roofing system, prime both sides of all metal flanges prior to installation.

B301005 GUTTERS AND DOWNSPOUTS

Provide gutters and downspouts compatible with roofing material and finish. Concealed (interior) gutters and downspouts are prohibited. The primary and secondary drainage systems must be sized in accordance with applicable Plumbing and Building Codes. Finish must be baked-on factory applied color coating of polyvinylidene fluoride (PVF2) or other equivalent fluorocarbon coating with a minimum thickness of 0.8 to 1.3 mils.

B301090 OTHER ROOFING

B301090 1.1 LIGHTNING PROTECTION

Lightning protection component penetrations and attachments must be sealed and flashed and anchored in a permanent manner and in a manner to avoid the degradation of the watertight integrity of the roof system. Do not cut or otherwise disturb the roof membrane. Mastic seals in the plane of the roof are unacceptable. Anchor plates set in mastic must be set on roof surface cleaned of aggregate and loose material prior to mastic application.

B301090 1.2 VEGETATED ROOFS

Where vegetated roofs are specified, provide additional technical specification for Government approval. Refer to UFC 3-110-03 and Whole Building Design Guide section titled "Vegetated Roof Covering ".

-- End of Section --

FORMS

ROOFING SYSTEM COMPONENTS

1. Contract Number: _____

2. Building Number and Location: _____

3. NAVFAC Specification Number: _____

4. Deck Type: _____

5. Slope of Deck: _____

6. Insulation Type and Thickness:_____

7. Insulation Manufacturer: _____

8. Vapor Retarder (_____) Yes (_____) No

9. Vapor Retarder Type: _____

10. Roofing Description: _____

    Manufacturer (Name, address, and phone no.): _____

    _____

    Type: _____

    Method of attachment: _____

11. Statement of Compliance or Exception: _____

    _____

    _____

12. Date Roof Completed: _____

13. Warranty Period: _____

14. Roofing Contractor (Name and Address):

    _____

    _____

    _____

15. Prime Contractor (Name and Address):

    _____

_____

_____

Contractor's Signature _____ Date: _____

Inspector's Signature _____ Date: _____

Form page 1

CONTRACTOR'S FIVE (5) YEAR NO PENAL SUM WARRANTY FOR STRUCTURAL STANDING SEAM METAL ROOF (SSSMR) SYSTEM

FACILITY DESCRIPTION_____

BUILDING NUMBER:_____

CONTRACT NUMBER:_____

CONTRACTOR

CONTRACTOR:_____

ADDRESS:_____

POINT OF CONTACT:_____

TELEPHONE NUMBER:_____

OWNER

OWNER:_____

ADDRESS:_____

POINT OF CONTACT:_____

TELEPHONE NUMBER:_____

CONSTRUCTION AGENT

CONSTRUCTION AGENT:_____

ADDRESS:_____

POINT OF CONTACT:_____

TELEPHONE NUMBER:_____

Warranty page 1

CONTRACTOR'S FIVE (5) YEAR NO PENAL SUM WARRANTY FOR STRUCTURAL STANDING SEAM METAL ROOF (SSSMR) SYSTEM (continued)

THE SSSMR SYSTEM INSTALLED ON THE ABOVE NAMED BUILDING IS WARRANTED BY _____ FOR A PERIOD OF FIVE (5) YEARS AGAINST WORKMANSHIP AND MATERIAL DEFICIENCES, WIND DAMAGE, STRUCTURAL FAILURE, AND LEAKAGE. THE SSSMR SYSTEM COVERED UNDER THIS WARRANTY INCLUDES, BUT IS NOT BE LIMITED TO, THE FOLLOWING: THE ENTIRE ROOFING SYSTEM, MANUFACTURER SUPPLIED FRAMING AND STRUCTURAL MEMBERS, METAL ROOF PANELS, FASTENERS, CONNECTORS, ROOF SECUREMENT COMPONENTS, AND ASSEMBLIES TESTED AND APPROVED IN ACCORDANCE WITH ASTM E 1592. IN ADDITION, THE SYSTEM PANEL FINISHES, SLIP SHEET, INSULATION, VAPOR RETARDER, ALL ACCESSORIES, COMPONENTS, AND TRIM AND ALL CONNECTIONS ARE INCLUDED. THIS INCLUDES ROOF PENETRATION ITEMS SUCH AS VENTS, CURBS, SKYLIGHTS; INTERIOR OR EXTERIOR GUTTERS AND DOWNSPOUTS; EAVES, RIDGE, HIP, VALLEY, RAKE, GABLE, WALL, OR OTHER ROOF SYSTEM FLASHINGS INSTALLED AND ANY OTHER COMPONENTS SPECIFIED WITHIN THIS CONTRACT TO PROVIDE A WEATHERTIGHT ROOF SYSTEM; AND ITEMS SPECIFIED IN OTHER SECTIONS OF THE SPECIFICATIONS THAT ARE PART OF THE SSSMR SYSTEM.

ALL MATERIAL DEFICIENCIES, WIND DAMAGE, STRUCTURAL FAILURE, AND LEAKAGE ASSOCIATED WITH THE SSSMR SYSTEM COVERED UNDER THIS WARRANTY WILL BE REPAIRED AS APPROVED BY THE CONTRACTING OFFICER. THIS WARRANTY COVERS THE ENTIRE COST OF REPAIR OR REPLACEMENT, INCLUDING ALL MATERIAL, LABOR, AND RELATED MARKUPS. THE ABOVE REFERENCED WARRANTY COMMENCED ON THE DATE OF FINAL ACCEPTANCE ON _____ AND WILL REMAIN IN EFFECT FOR STATED DURATION FROM THIS DATE.

SIGNED, DATED, AND NOTARIZED (BY COMPANY PRESIDENT)

_____

(Company President) (Date)

CONTRACTOR'S FIVE (5) YEAR NO PENAL SUM WARRANTY FOR STRUCTURAL STANDING SEAM METAL ROOF (SSSMR) SYSTEM (continued)

SUPPLEMENT THIS WARRANTY WITH WRITTEN WARRANTIES FROM THE MANUFACTURER AND INSTALLER OF THE SSSMR SYSTEM, AND SUBMIT THEM ALONG WITH THE CONTRACTOR'S WARRANTY. HOWEVER, THE CONTRACTOR WILL BE ULTIMATELY RESPONSIBLE FOR THIS WARRANTY AS OUTLINED IN THE SPECIFICATIONS AND AS INDICATED IN THIS WARRANTY EXAMPLE.

EXCLUSIONS FROM COVERAGE

1. NATURAL DISASTERS, ACTS OF GOD (LIGHTNING, FIRE, EXPLOSIONS, SUSTAINED WIND FORCES IN EXCESS OF THE DESIGN CRITERIA, EARTHQUAKES, AND HAIL).

2. ACTS OF NEGLIGENCE OR ABUSE OR MISUSE BY GOVERNMENT OR OTHER PERSONNEL, INCLUDING ACCIDENTS, VANDALISM, CIVIL DISOBEDIENCE, WAR, OR DAMAGE CAUSED BY FALLING OBJECTS.

3. DAMAGE BY STRUCTURAL FAILURE, SETTLEMENT, MOVEMENT, DISTORTION, WARPAGE, OR DISPLACEMENT OF THE BUILDING STRUCTURE OR ALTERATIONS MADE TO THE BUILDING.

4. CORROSION CAUSED BY EXPOSURE TO CORROSIVE CHEMICALS, ASH OR FUMES GENERATED OR RELEASED INSIDE OR OUTSIDE THE BUILDING FROM CHEMICAL PLANTS, FOUNDRIES, PLATING WORKS, KILNS, FERTILIZER FACTORIES, PAPER PLANTS, AND THE LIKE.

5. FAILURE OF ANY PART OF THE SSSMR SYSTEM DUE TO ACTIONS BY THE OWNER TO INHIBIT FREE DRAINAGE OF WATER FROM THE ROOF AND GUTTERS AND DOWNSPOUTS OR ALLOW PONDING WATER TO COLLECT ON THE ROOF SURFACE.

6. THIS WARRANTY APPLIES TO THE SSSMR SYSTEM. IT DOES NOT INCLUDE ANY CONSEQUENTIAL DAMAGE TO THE BUILDING INTERIOR OR CONTENTS THAT IS COVERED BY THE WARRANTY OF CONSTRUCTION CLAUSE INCLUDED IN THIS CONTRACT.

7. THIS WARRANTY CANNOT BE TRANSFERRED TO ANOTHER OWNER WITHOUT WRITTEN CONSENT OF THE CONTRACTOR; AND THIS WARRANTY AND THE CONTRACT PROVISIONS WILL TAKE PRECEDENCE OVER ANY CONFLICTS WITH STATE STATUTES.

**

CONTRACTOR'S FIVE (5) YEAR NO PENAL SUM WARRANTY FOR STRUCTURAL STANDING SEAM METAL ROOF (SSSMR) SYSTEM (continued)

**REPORTS OF LEAKS AND SSSMR SYSTEM DEFICIENCIES WILL BE RESPONDED TO WITHIN 48 HOURS OF RECEIPT OF NOTICE, BY TELEPHONE OR IN WRITING, FROM EITHER THE OWNER OR CONTRACTING OFFICER. EMERGENCY REPAIRS TO PREVENT FURTHER ROOF LEAKS WILL BE INITIATED IMMEDIATELY; A WRITTEN PLAN WILL BE SUBMITTED FOR APPROVAL TO REPAIR OR REPLACE THIS SSSMR SYSTEM WITHIN SEVEN (7) CALENDAR DAYS. ACTUAL WORK FOR PERMANENT REPAIRS OR REPLACEMENT WILL BE STARTED WITHIN 30 DAYS AFTER RECEIPT OF NOTICE, AND COMPLETED WITHIN A REASONABLE TIME FRAME. IF THE CONTRACTOR FAILS TO ADEQUATELY RESPOND TO THE WARRANTY PROVISIONS, AS STATED IN THE CONTRACT AND AS CONTAINED HEREIN, THE CONTRACTING OFFICER MAY HAVE THE SSSMR SYSTEM REPAIRED OR REPLACED BY OTHERS AND CHARGE THE COST TO THE CONTRACTOR.

IN THE EVENT THE CONTRACTOR DISPUTES THE EXISTENCE OF A WARRANTABLE DEFECT, THE CONTRACTOR MAY CHALLENGE THE OWNER'S DEMAND FOR REPAIRS OR REPLACEMENT DIRECTED BY THE OWNER OR CONTRACTING OFFICER EITHER BY REQUESTING A CONTRACTING OFFICER'S DECISION UNDER THE CONTRACT DISPUTES ACT, OR BY REQUESTING THAT AN ARBITRATOR RESOLVE THE ISSUE. THE REQUEST FOR AN ARBITRATOR MUST BE MADE WITHIN 48 HOURS OF BEING NOTIFIED OF THE DISPUTED DEFECTS. UPON BEING INVOKED, THE PARTIES WILL, WITHIN TEN (10) DAYS, JOINTLY REQUEST A LIST OF FIVE (5) ARBITRATORS FROM THE FEDERAL MEDIATION AND CONCILIATION SERVICE. THE PARTIES WILL CONFER WITHIN TEN (10) DAYS AFTER RECEIPT OF THE LIST TO SEEK AGREEMENT ON AN ARBITRATOR. IF THE PARTIES CANNOT AGREE ON AN ARBITRATOR, THE CONTRACTING OFFICER AND THE PRESIDENT OF THE CONTRACTOR'S COMPANY WILL STRIKE ONE (1) NAME FROM THE LIST ALTERNATIVELY UNTIL ONE (1) NAME REMAINS. THE REMAINING PERSON WILL BE THE DULY SELECTED ARBITRATOR. THE COSTS OF THE ARBITRATION, INCLUDING THE ARBITRATOR'S FEE AND EXPENSES, COURT REPORTER, COURTROOM OR SITE SELECTED, ETC., WILL BE BORNE EQUALLY BETWEEN THE PARTIES. EITHER PARTY DESIRING A COPY OF THE TRANSCRIPT WILL PAY FOR THE TRANSCRIPT. A HEARING WILL BE HELD AS SOON AS THE PARTIES CAN MUTUALLY AGREE. A WRITTEN ARBITRATOR'S DECISION WILL BE REQUESTED NOT LATER THAN 30 DAYS FOLLOWING THE HEARING. THE DECISION OF THE ARBITRATOR WILL NOT BE BINDING; HOWEVER, IT WILL BE ADMISSIBLE IN ANY SUBSEQUENT APPEAL UNDER THE CONTRACT DISPUTES ACT.

A FRAMED COPY OF THIS WARRANTY WILL BE POSTED IN THE MECHANICAL ROOM OR OTHER APPROVED LOCATION DURING THE ENTIRE WARRANTY PERIOD.

SECTION C10

INTERIOR CONSTRUCTION
09/22

C10 GENERAL

RFP Part 3 including the Engineering System Requirements (ESR) provide project specific requirements. The RFP Part 4, Performance Technical Sections (PTS) provide generalized technical requirements that apply to multiple facility types and include more requirements than are applicable to any one project. Therefore, only the RFP Part 4 requirements that apply to the project and further define the RFP Part 3 project specific requirements are required.

C10 1.1 DESIGN GUIDANCE

Provide the design and installation in accordance with the following references. This Performance Technical Specification (PTS) adds clarification to the fundamental requirements contained in the following Government Standards. The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification*.

Industry standards, codes, and Government standards that are referenced in the section text that are not found in the Unified Master Reference List (UMRL) in the Federal Facility Criteria (FFC) at the Whole Building Design Guide (WBDG) website, are listed below for basic designation identification. Comply with the required and advisory portions of the current edition of the standard at the time of contract award.

C10 1.1.1 Industry Standards and Codes

Sealant, Waterproofing & Restoration Institute

C10 1.1.2 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s):UFC 3-101-01, ArchitectureUFC 3-120-10, Interior Design)
UFC 1-200-02	High Performance and Sustainable Building Requirements

C10 1.2 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Provide verification of satisfactory interior construction assemblies' performance via Performance Verification Testing, as detailed in this

section of the RFP. Provide special tests and special inspections in accordance with Part 2 Section 01 45 00.05 20, *Design and Construction Quality Control*at no additional cost to the Government.

C10 1.2.1 Slump and Compressive Strength Tests for Grout

Slump between 8 and 11 inches (200 and 275 mm). Provide minimum grout strength of 2000 PSI in 28 days, as tested in accordance with American Society for Testing and Materials (ASTM) C 1019.

C10 1.2.2 Field Test for Sprayed Fire-Resistive Materials

Engage a qualified testing and inspection agency to prepare testing and adhesion reports to test for bond strength. Test bond strength in accordance with ASTM E 736 and be found to meet the requirements in UL's *Fire Resistance Directory*for coating materials.

C10 1.3 DESIGN SUBMITTALS

Provide design submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, Facilities Criteria (FC) 1-300-09N, *Navy and Marine CorpsDesign Procedures*, UFC 3-101-01, *Architecture*, and UFC 3-301-01, *Structural Engineering*.

C10 1.4 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*. In addition to the Z10 requirements, the Designer of Record (DOR) must approve the following submittals as a minimum:

Doors, door hardware, windows and glazing, cabinets and countertops, casework, and fireproofing/firestopping.

All structural elements necessary for construction

C10 1.5 SUSTAINABILITY

Provide products and systems in accordance with Part 2 Section 01 33 29, *Sustainability Requirements and Reporting*.

C1010 PARTITIONS

For general use, metal studs and standard grade GWB, CMU with prime filler coat, or CMU/cast-in-place concrete with GWB or skim coat plaster are acceptable unless stated otherwise in the Project Program. Reinforce points where doorknobs can strike a wall and anchorage points for wall mounted equipment.

Provide control joints and installation techniques as recommended by the manufacturer. See PTS Section C30, *Interior Finishes*, for additional information.

Provide painted GWB with access panels at surfaces furred for HVAC, plumbing and other utility services and controls behind wall surfaces.

Acceptable systems where "IMPACT RESISTANCE" (areas subject to physical abuse or wear) is designated in the project program requirements for impact resistance systems include:

a. CMU/cast-in-place concrete with or without plaster or furred impact resistant GWB or surface applied impact resistant textured acrylic architectural coating system.
b. GWB/metal stud system reinforced for impact resistance with a double layer of gypsum board using at least one layer of impact resistant gypsum board to resist denting and puncturing on the impact surface. If wall is subjected to impact on both sides, both sides of the stud require a double layer of gypsum board. Structural, mechanical, and acoustical design requirements effect the metal stud/gypsum support configuration.

C101001 FIXED PARTITIONS

Provide fixed partitions, to include masonry and cast-in-place concrete walls. Sound-rated partition assemblies must have a minimum Sound Transmission Coefficient (STC) as required by the project program. Construct sound-rated bulkheads above partition assemblies for continuity to the deck above.

C101001 1.1 CAST-IN-PLACE INTERIOR CONCRETE WALLS

Accomplish work in accordance with UFC 1-200-01, *DoD Building Code (General Building Requirements)*, American Concrete Institute (ACI) 117 and 301/301M. Concrete Mix Design must be suitable for the job conditions.

C101001 1.2 MASONRY PARTITIONS

Accomplish work in accordance with ACI 530.1/ American Society of Civil Engineers (ASCE) 6/The Masonry Society (TMS) 602 and associated ASTM Standards for concrete masonry wall construction.

C101001 1.2.1 Testing

Determine masonry strength in accordance with ACI 530.1. Where fire-rated assemblies are indicated, provide concrete masonry units that have been tested in conformance with ASTM E 119. Provide certificate of compliance to the Designer of Record (DOR) that the materials and assemblies meet the fire ratings indicated on the drawings.

C101001 1.2.2 Masonry Units Types

C101001 1.2.2.1 Concrete Masonry Units

Units of modular dimensions and air, water or steam cured. Surfaces of units to be plastered or stuccoed must be sufficiently rough to provide bond and exposed surfaces of units must be smooth and of uniform texture.

a. Hollow Load-Bearing Units: ASTM C 90, Type I or II, made of lightweight or normal weight aggregate.
b. Hollow Non-Load-Bearing Units: ASTM C 129, Type I or II, made with lightweight or normal weight aggregate.
c. Special Shapes: Provide special shapes as necessary to

complete the work.

d. Fire-Rated CMU: Products must be tested and approved by United Laboratories (UL) according to testing methods described in ASTM E 119, and listed as 2, 3 or 4-hour fire-rated.

C101001 1.2.2.2 Pre-Faced Concrete Masonry Units

Provide pre-faced concrete masonry units conforming to ASTM C 744, load-bearing or non-load-bearing, lightweight, Grade N, Type I.

C101001 1.2.3 Masonry Partition Materials

a. Mortar - Provide ASTM C 270, Type N or S for non-shear-wall interior masonry.
b. Portland Cement - ASTM C 150, Type I, II, or III.
c. Masonry Cement - ASTM C 91, Type N, S, or M.
d. Sand - ASTM C144.
e. Grout - ASTM C 476, Fine aggregate for grouting cells / spaces 3" (75 mm) or less, or coarse aggregate for grouting cells / spaces greater than 3" (75 mm). Slump between 8 and 11 inches (200 and 275 mm). Provide minimum grout strength of 2000 PSI in 28 days, as tested in accordance with ASTM C 1019.

C101001 1.2.4 Masonry Accessories

a. Horizontal Joint Reinforcement – Fabricate from cold drawn steel wire, ASTM A 82. Wire must be hot-dipped galvanized after fabrication in accordance with ASTM A 153/ A 153M, Class B-2, 1.5 ounces of zinc per square foot (42.52 g / 0.0929 sq. meter).
b. Anchors and Wall Ties – Provide of stainless steel, ASTM A 167, Type 304, or zinc-coated steel.
c. Reinforcing Bars – ASTM A 615 / A 615M.

C101001 1.3 COLD-FORMED METAL FRAMING

Provide Cold-Formed Metal Framing in accordance with the provisions of UFC 1-200-01, *General Building Requirements*, and the International Building Code (IBC).

C101001 1.3.1 Studs

Galvanized steel, ASTM A 653 / A 653M, SS Grade 50, G60

C101001 1.3.2 Framing Accessories

Fabricate steel-framing accessories of the same material and finish used for framing members, with minimum yield strength of 33,000 psi (230 Mpa). Accessories include, but are not limited to, the following: bracing, bridging, blocking, web stiffeners, end and foundation clips, gusset plates, stud kickers, knee braces, girts, joist hangers, reinforcing and backer plates.

Provide permanent metal-to-metal contact separation from stud to

electrical conduits, plumbing pipes, and other internal wall system components, such as electrical wires.

C101001 1.4 METAL SUPPORT ASSEMBLIES

Provide steel materials for metal support systems with galvanized coating in accordance with ASTM A 653/ A 653M, G60; aluminum coating ASTM A 463/ A 463M, T1-25; or a 55% aluminum-zinc coating ASTM A 792.

C101001 1.4.1 Suspended and Furred Ceiling Systems, and Wall Furring

ASTM C 841(for lath); ASTM C 645 (for GWB).

C101001 1.4.2 Non-load-Bearing Wall Framing / Furring

ML/SFA MLF (for lath); ASTM C 645, but not thinner than 0.0179 inch (0.4547 mm) thickness. Provide 0.0329 inch (0.8357 mm) minimum thickness for supporting wall hung items such as cabinetwork, equipment and fixtures and for GWB.

C101001 1.5 ROUGH CARPENTRY

Unless otherwise noted, conceal all rough carpentry from view. All framing and board lumber shall be graded and marked by a recognized association or independent inspection agency. Certification of grade is acceptable in lieu of grade markings. Framing lumber such as studs, plates, caps, bucks and nailers must be of the minimum grade for the application in accordance with the grading rules for the local species of framing and board lumber.

C101001 1.5.1 Moisture Content

Air-dry or kiln dry lumber as follows:

a. Framing lumber and boards – 19% maximum
b. Timbers 5" and thicker – 25% maximum

C101001 1.5.2 Fire-retardant Treatment

Comply with AWPA C20 or AWPA C27.

C101001 1.5.3 Preservative Treated Lumber

Preservative treated lumber must be in accordance with AWPA Standards.

C101001 1.5.4 Structural Lumber

Provide of species and grade as listed in AF&PA 101 that have the following minimum allowable unit stresses: 1050 Fb, 700 Fc with 1,200,000 E (for engineered uses) but not less than required by structural calculations.

C101001 1.5.5 Plywood, Structural

PS-1, PS-2.

a. Plywood (Concealed) - C-D grade, exposure 1 durability

classification, span rating of 24/16 or greater.

b. Plywood Shear Walls - Structural I, C-C or C-D grade, and a minimum thickness of 1/2 inch (12.5 mm), but not less than required by structural calculations.

C101005 INTERIOR WINDOWS

For fixed interior windows, assemblies include frames, glazing, caulking, and other associated work. For other window types, see PTS Section B20, *Exterior Enclosure*. Glazing for windows specified under this section is located in C101007, "Interior Glazing."

C101005 1.1 ALUMINUM WINDOWS

Each window unit must be a complete factory assembled unit with or without glass installed. Fabrication of window units must comply with American Architectural Manufacturers Association (AAMA) 101.

a. Fixed and Operable Windows - HC40 for non-residential (commercial).
b. Sliding Glass Pass Windows - Frames and glass channels must be of heavy type 6063-TS aluminum extrusions. Provide 1/4-inch (6.35 mm) clear tempered glass.

C101005 1.2 VISION PANELS

a. Hollow Metal Vision Panels – must meet the requirements of hollow metal frames, paragraph C102001.

C101005 1.3 FINISHES

Finish exposed aluminum or steel window surfaces as follows:

a. Anodic Coating

Architectural Class I (0.7 mil or thicker), designation AA-M10-C22-A41, clear (natural) or A42, integral color or A44, electrolytically deposited color anodized.

b. Organic Coating

Provide a high-performance coating in accordance with AAMA 2605 with a total dry film thickness not less than 1.2 mils (0.03 mm).

C101006 GLAZED PARTITIONS & STOREFRONTS

This paragraph covers fixed interior glazed partitions, including interior storefronts with doors. Assemblies include frames, glazing, caulking, and other associated work. See Section B20, *Exterior Enclosure*, for aluminum storefront framing components and performance requirements.

C101006 1.1 GLASS

Refer to "Interior Glazing".

C101006 1.2 SETTING AND SEALING MATERIALS

Provide as specified in the *GANA Glazing Manual*, SIGMA TM-3000 and SIGMA TB-3001, and in accordance with manufacturers recommendations.

C101007 INTERIOR GLAZING

ASTM C 1036, unless specified otherwise. Provide patterned glass where required to obscure view into bathrooms and dressing rooms.

Provide setting and sealing materials, stops and gaskets as recommended by the glass or acrylic sheet manufacturer.

Glazing thickness indicated in the following paragraphs is the minimum acceptable thickness. Provide thicker glazing if required by the code or the manufacturer for the given application.

C101007 1.1 GLASS

C101007 1.1.1 Clear Glass

Type I, class I (clear), quality q4 or q5 for patterned glass.

C101007 1.1.2 Wire Glass

Provide glazing of Type II, Class I, Form I, Quality q8 mesh stainless steel, diamond pattern, 1/4 inch (6.35 mm) thick. Glass must comply with ASTM E 163.

C101007 1.1.3 Tempered Glass

ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated), Type I, Class 1 (clear), quality q3.

C101008 INTERIOR JOINT SEALANT

Sealant joint design and application must be in accordance with the general requirements of *Sealants: A Professionals' Guide*from the Sealant, Waterproofing & Restoration Institute. Refer to manufacturers' recommendations for chemical resistance.

C101008 1.1 JOINT SEALANT TYPES FOR INTERIOR WORK

Sealants must be paintable, and must match the color of adjacent surfaces.

a. Vertical Surfaces - ASTM C 920, Type M, Grade NS, Class 25, Use NT.
b. Horizontal Surfaces - ASTM C 920, ASTM D 1190 for traffic surfaces, Type M, Class 25, Use T.
c. Food Service – Use a Vinyl Acetate Homopolymer, or other low VOC, non-toxic sealant approved for use in food preparation areas.
d. Chemical Resistance - Ensure that all sealants are chemically compatible or resistant to adjacent materials, or materials that may come into contact with the sealants in the course of the building life.

C1020 INTERIOR DOORS

Provide door hardware as specified in "Interior Door Hardware" in this section.

C102001 STANDARD INTERIOR DOORS

This paragraph covers all interior wood or hollow metal doors with frames, hardware, locks, and finish.

C102001 1.1 STEEL DOORS

Hardware preparation must be in accordance with Steel Door Institute (SDI) 17, American National Standards Institute/Door and Hardware Institute (ANSI/DHI) A115 and ANSI/SDI 100. Doors must be hung in accordance with ANSI/SDI 100.

C102001 1.1.1 Standard Steel Doors

Level 4, (for all door used by the general public, high use, high abuse types), with a physical performance level of 'A'. Maximum door undercut must not exceed 3/4 inch (19 mm).

C102001 1.1.2 Sound Insulated Doors and Frames

Provide sound insulated door and frame assemblies into rooms requiring wall assemblies to be sound insulated with a Sound Transmission Class (STC) rating as required.

C102001 1.1.3 Accessories

a. Provide stationary, sight-proof type louvers which comply with SDI 111-C. Use lightproof louvers if function of room requires darkness. Louver frames must be 20-gage steel with louver blades minimum 24 gage.

C102001 1.2 STANDARD STEEL FRAMES

ANSI A 250.8. Form frames with welded corners for installation in masonry partitions. Set frames in accordance with SDI 105. Form stops and beads with 20-gauge steel.

Provide a minimum of three jamb anchors and base steel anchors per frame, zinc-coated or painted with rust-inhibitive paint, not lighter the 18 gauge. Secure frames to previously installed concrete or masonry with expansion bolts in accordance with SDI 11-F. Provide mortar infill of frames in masonry walls.

C102001 1.3 FINISHES

a. Factory-Primed Finish. Doors and frames in non-humid, non-corrosive environments must be factory primed with a rust inhibitive coating as specified in ANSI A 250.8. Factory prime doors on six sides of the door.
b. Zinc-Iron Alloy Coating (Galvanealed) and Factory Primed Finish
c. Fabricate interior doors and frames (for installation in such rooms as kitchens, laboratories, battery charging, utility rooms and humid areas such as shower/drying areas, areas with frequent floor mopping, or corrosive chemical atmospheres) from zinc coated steel, alloyed type, complying with ASTM A 653/ A 653M. Factory prime doors and frames as specified in ANSI A 250.8.

d. Manufacturer's primer must be compatible with door finish system in C30, Interior Coatings.

C102001 1.4 WOOD DOORS

C102001 1.4.1 Wood Doors

Install wood doors according to workmanship requirements of the Architectural Woodwork Institute Quality Standard 900-T-4 Custom Grade. Provide metal door frames for wood doors in non-residential construction.

For non-residential buildings provide extra-heavy doors.

Wood doors shall be solid wood doors with wood core and solid wood edge bands. Vertical edge bands must be one piece or laminated two-piece solid lumber to match face veneer species for natural finish wood doors. Reinforce door at all hardware attachments to door with sound grade hardwood. Horizontal edge bands must be solid wood or structural composite lumber.

a. Interior Flush Doors - Flush doors must conform to Window and Door Manufacturers Association (WDMA) I.S.6A-01. Doors must be premium grade, heavy duty, or otherwise as required by the project program.

Provide WDMA I.S. 1A-04 SCLC-5 structural composite lumber core, or staved lumber core. Do not use particleboard cores. Provide hardwood or softwood veneers cut for the best presentation for natural finishing of doors. Set match veneers of all components of a door opening. Face veneers must be 1/20" thick before sanding.

b. Closet Doors – Provide flush doors of premium or custom grade, conforming to WDMA I.S.1A-01, premium or custom grade, heavy duty. Doors must be hinged or sliding.

C102001 1.4.2 Wood Door Accessories

a. Door Louvers - Louver must comply with SDI 111-C. Louver frames must be 20-gage steel with louver blades minimum 24 gage.
b. Door Light Openings - Provide glazed openings with the manufacturer's standard wood moldings. Moldings for doors to receive a natural finish must be of the same species and color of the face veneer.

C102001 1.4.3 Fabrication

a. Marking - Each door must bear a stamp, brand or other identifying mark indicating quality and construction of the door.
b. Adhesives and Bonds - WDMA I.S. 1-A. Use Type I (water-proof) adhesive for assembly of interior doors and for the fabrication of stiles, rails, crossbands, and veneers. Adhesive for doors to receive a natural finish must be non-staining. Type II (water resistant) is allowed for fabrication of core parts.

C102001 1.4.4 Finishes

Unless required otherwise by the project program, typically provide natural finish wood doors. Factory prime and or seal on all six sides of doors.

a. Factory Finish - Provide doors finished at the factory as follows: Architectural Woodwork Institute (AWI) Quality Standards Section 1500, specification for Conversion varnish, alkyd urea catalyzed polyurethane, or acrylated UV curable epoxy. The coating must be AWI Quality Standards premium, medium rubbed sheen, with an open or closed grain effect. Poly-wrap prefinished wood doors at factory for shipping.

C102002 GLAZED INTERIOR DOORS

This paragraph covers all glazed interior doors with glass, frames, hardware and locking devices. See paragraph entitled "Interior Glazing" in this section for glazing options.

C102002 1.1 ALUMINUM DOORS, FRAMES AND STOREFRONT

Provide swing-type aluminum doors and frames complete with framing members, transoms, side-lites, and accessories. Fabricate of ASTM B 221, Alloy 6063-TS for extrusions.

C102002 1.2 FABRICATION

C102002 1.2.1 Aluminum Frames

Provide frames with removable glass stops and glazing beads to accommodate fixed glazing. Countersink screws for exposed fastenings. Jointing of framing members must obtain hairline fit, be reinforced, and mechanically secured.

C102002 1.2.2 Aluminum Doors

Doors must not be less than 1-3/4 inches (44 mm) thick, with a minimum wall thickness of 0.125 inch (3.2 mm), except beads and trim, 0.050 inch (1.27 mm). Full glazed stile and rail doors must have medium or wide stiles and rails. Maximum water leakage of the door and frame must be "no uncontrolled water penetrating systems or appearing on systems' normally exposed interior surfaces from sources other than condensation." Water controlled by flashing and gutters that is drained to exterior and cannot damage adjacent materials or finishes is not considered water leakage.

C102002 1.2.3 Welding and Fastening

Locate welds and fasteners on unexposed surfaces, where possible. Exposed welds must be dressed smoothly. Exposed fasteners must have counter-sunk heads. Weld concealed reinforcements for hardware in place. Hardware reinforcements must be of stainless steel or steel with a hot-dipped galvanized finish, and must be secured with stainless steel screws.

C102002 1.2.4 Finishes

Provide exposed aluminum surfaces with factory finish of anodic or organic coating. Anodic coatings must conform to AA 45, with an Architectural Class I finish, 0.7 mil or thicker. Organic coatings must be a baked enamel finish in accordance with AAMA 2605 with a total dry film thickness not less than 1.2 mil. Exposed fasteners to match the door finish.

C102003 FIRE DOORS

This paragraph covers all interior fire doors, including all necessary frames, hardware, closing devices, and alarms associated with the door.

C102003 1.1 FIRE AND SMOKE DOORS AND FRAMES

Provide in conformance with National Fire Protection Association (NFPA) 80 an NFPA 105. Fire doors and frames must bear the label of UL, Factory Mutual (FM) or WHI attesting to the rating required. Door and frame assemblies must be tested for conformance with NFPA 252 or UL 10C (for positive pressure). Wood fire doors must also comply with ASTM E 152.

Provide stainless steel astragals complying with NFPA 80 for fire-rated assemblies and NFPA 105 for smoke control assemblies.

C102007 INTERIOR DOOR HARDWARE

C102007 1.1 DOOR HARDWARE

Provide the services of an Architectural Hardware Consultant (AHC), Certified Door Consultant (CDC), or an Electrified Hardware Consultant (EHC) to assist the Designer of Record in preparation of the door hardware schedule and product selection. The hardware consultant must sign and seal the door hardware construction submittal. Provide, as far as feasible, locks, hinges, pivots, and closers from one lock, hinge, pivot, or closer manufacturer's make. All door hardware must be clearly and permanently marked by the manufacturer, on a location to be visible after installation. Modify hardware as necessary to provide features indicated or specified. For necessary hardware items not indicated in these specification sections, provide American National Standards Institute/Builders Hardware Manufacturers Association (ANSI/BHMA) grade 1 rated hardware.

C102007 1.1.1 Hardware for Fire Doors

All hardware provided must meet the requirements of NFPA 80 for Fire Doors and NFPA 101 for exit doors. Hardware must bear the label of Underwriter's Laboratories, Inc., and be listed in UL BMD or labeled and listed by another testing laboratory acceptable to the contracting officer. Comply with NFPA 105 for smoke control assemblies.

C102007 1.1.2 Hinges

BHMA A156.1, Grade 1, 4-1/2 x 4-1/2 inches (108 x 108 mm) with non-removable pin or anti-friction bearing hinges.

C102007 1.1.3 Locks and Latches

For non-residential buildings use Series 1000, Operational Grade 1, Security Grade 2 for stairways, building entrances, corridors, assembly spaces, and other high use interior doors. Use Series 4000, Grade 1 for non-residential locations not using Series 1000 hardware.

a. Mortise Locks and Latches - BHMA A 156.13, Series 1000, Operation Grade 1, Security Grade 2.
b. Bored Locks and Latches - BHMA A 156.2, Series 4000, Grade 1.

C102007 1.1.4 Card Key System

Provide card key type access units for specialized entries as required by the program. Provide lithium battery powered, magnetic stripe keycard locksets that are ANSI/BHMA A156.13, Series 1000, Grade 1, mortise or ANSI/BHMA A156.2, Series 4000, Grade 1, cylindrical locks, tamper resistant, UL listed with 1 inch (25 mm) throw deadbolt, 3/4-inch (19 mm) throw latch bolt, auxiliary dead-locking latch, and 2-3/4 inch (68.75 mm) backset. The latch bolt and the dead bolt must be operated simultaneously by rotating inside lever. Locks with mechanical override lock cylinders are not acceptable. Locks must be operated only by a correctly encoded keycard. Use of a newly issued keycard automatically re-keys the lock and voids the previous keycard. The lock must re-lock immediately after outside lever is turned and latch retracted. Locks must have memory that is capable of recording up to 140 entries into each room, identification of the keycard used to access the room, the date and time of entry. Entry information of the lock must be retrievable by a data key that can be inserted into the lock and then taken to the front desk printer to display information. Other components that are required for this system at the front desk are a personal or laptop computer, printer and encoder to program each key.

For exit device locks with card key access, provide mortise type, narrow stile exit devices with 24-volt DC, solenoid option for card key exterior access at aluminum storefront doors. Provide mortise type exit devices with 24-volt DC, solenoid option with alarm and remote exterior access for card key access at insulated hollow metal doors. The alarmed exit device must sound when exiting only.

System must be capable of accepting a minimum of 12 keycard access levels, security auditing and computer interfacing with the existing or new management system. Provide a single point of contact customer service representative accessible by telephone with a 10-digit telephone number without additional dialing hierarchies except that a maximum 4-digit extension is permissible. On-site service must be provided within 3 hours from request within the first 12 months of occupancy. Provide a 5-year parts and labor warranty.

C102007 1.1.5 Exit Devices

BHMA A 156.3, Grade 1. Provide touch bars in lieu of conventional crossbars and arms. Use manufacturer's integral touch bars in aluminum storefront doors.

C102007 1.1.6 Cylinders and Cores

Provide cylinders and cores for new locks, including locks provided under other sections of this specification. Cylinders and cores must have seven pin tumblers. Cylinders must be products of one manufacturer, and cores must be the products of one manufacturer. Rim cylinders, mortise cylinders, and knobs of bored locksets must have interchangeable cores, which are removable by special control keys. Stamp each interchangeable core with a key control symbol in a concealed place on the core.

C102007 1.1.7 Keying System

Provide a master key system for the facility unless more than one tenant/tenant command resides in a facility. Provide a grand master keying system, or great, grand master keying system if multiple tenants or multiple buildings are required. Provide an extension of the existing keying system for existing facility additions. Name the manufacturer of the existing locks, and indicate if they have interchangeable cores. Provide construction interchangeable cores when subcontractors require keys during construction.

Coordinate a keying system meeting. The Contractor's Project Manager, Superintendent, Hardware Subcontractor, Electrical Subcontractor (if keying hardware is electric), Designer of Record, Contracting Officer, Public Works Base Hardware Specialist, and the Using Activity must attend this meeting to establish the keying system for the project. This meeting is intended to identify base limitations, the necessary security, and access control within the facility. The meeting must produce a marked up copy of the floor plan indicating the doors to receive locks and the doors to be keyed together, and any master keying or grand master keying

C102007 1.1.8 Keys

Furnish one file key, one duplicate key and one working key for each key exchange and for each master and grand master keying system.

C102007 1.1.9 Key Cabinet and Control System

BHMA A 156.5. Provide key cabinet with 25% more key hooks than required for interior and exterior doors.

C102007 1.1.10 Lock Trim

Cast, forged or heavy wrought construction and commercial plain in design.

a. Knobs and Roses - Knobs and roses must meet test requirements of BHMA A 156.2 and BHMA A 156.13.
b. Lever Handles - Provide lever handles in lieu of knobs, as required by DoD Architectural Barriers Act (ABA) Standards. All lever handles must have the freewheeling feature.

C102007 1.1.11 Door Bolts

BHMA A 156.16. Provide automatic latching flush bolts for double doors with both door leafs active, BHMA A 156.3, Type 25.

C102007 1.1.12 Closers

BHMA A 156.4, Series C02000, Grade 1, with PT 4C, 1-1/2 inch piston, heavy duty forged arm, with full size cover.

C102007 1.1.13 Overhead Holders

BHMA A 156.8, Grade 1.

C102007 1.1.14 Closer Holder-Release Devices

BHMA A 156.15, Grade 1.

C102007 1.1.15 Door Protection Plates

Provide armor, mop, and kick plates conforming to BHMA A 156.6. Provide door kick plates on all doors with closers and doors leading to corridors or circulation spaces. Provide armor plates on all doors that receive cart traffic. Provide mop plates on all doors in rooms that have a mop-able floor finish.

C102007 1.1.16 Door Stops and Silencers

BHMA A 156.16, Type L03011, three per single door and four per double door.

C102007 1.1.17 Thresholds

BHMA A 156.21.

C102007 1.1.18 Door Gasketing

BHMA A 156.22. Use light-proof gasketing for room functions that require darkness and integral sound-proof gasketing on acoustically rated doors.

C102007 1.1.19 Finishes

Provide one of the following hardware finish systems, matching the exterior hardware finish system.

a. BHMA A156.18. Hardware must have BHMA 630 finish (satin stainless steel), unless specified otherwise. Provide items not manufactured in stainless steel in BHMA 626 finish (satin chromium plated) over brass or bronze, except surface door closers which must have aluminum paint finish, and except steel hinges which must have BHMA 652 finish (satin chromium plated). Hinges for exterior doors must be stainless steel with BHMA 630 finish or chromium plated brass or bronze with BHMA 626 finish. Exit devices may be provided in BHMA 626 finish in lieu of BHMA 630 finish except where BHMA 630 is specified under paragraph entitled "Hardware Sets". Exposed parts of concealed closers must have finish to match lock and door trim. Hardware for

aluminum doors must be finished to match the doors.

C102090 OTHER INTERIOR SPECIALTY DOORS

C102090 1.1 ACCESS DOORS

Provide manufactured access doors and frames of 16-gage steel minimum with concealed pivots or a continuous piano hinge and flush stainless steel cam latch. Finish with manufacturer's standard primer coat finish and paint to match the wall or ceiling unless a stainless steel finish is required in the Project Program. Provide UL Rated access doors in fire rated assemblies. Access panels located in furred wall spaces must have an inserted material to match adjacent wall surface. Size access doors large enough to allow convenient hand and tool access and operation of controls and equipment beyond the door. If maintenance of controls or equipment beyond the door requires removal, size access door to allow removal and reinstallation of new equipment through the access door. Provide access panels capable of receiving finish material inserts in visible wall locations of habitable spaces.

C102091 OTHER INTERIOR PERSONNEL DOORS

Interior personnel doors not described by the assembly categories listed above.

C1030 SPECIALTIES

C103001 COMPARTMENTS, CUBICLES AND TOILET PARTITIONS

This paragraph covers assemblies for individual compartments, cubicles, toilet partitions and urinal screens.

C103001 1.1 TOILET PARTITIONS

FS A-A-60003. Provide toilet compartments at multi-fixture toilet rooms of Type I, Style B-Ceiling Hung, C-Overhead Braced, or F-Overhead braced-alcove. Reinforce panels to receive partition-mounted accessories. Steel and Plastic toilet partitions must have a recovered materials content of 20 to 30 percent.

C103001 1.2 URINAL SCREENS

FS A-A-60003. Type III, Style A, floor supported and wall hung or Style D, wall hung. Wall hung urinal screens must be secured with continuous flanges to urinal screen and wall.

C103001 1.3 HARDWARE AND FITTINGS

Chrome-plated or stainless steel door latches and coat hooks. Provide one coat hook per compartment door. Latches and hinges for handicapped compartments must comply with DoD ABA Standards.

C103001 1.4 FINISHES

Finishes must comply with FS A-A-60003. Use only one type of partition per building.

a. Metal toilet partitions and urinal screens must be made of stainless steel.
b. Solid plastic partitions (HDPE) must be fabricated of polymer resins (polyethylene) formed under high pressure forming a single component section one inch thick. Color must extend throughout the panel thickness.
c. Phenolic core panels.
d. Laminated plastic partitions are acceptable in low or limited use applications (one or two toilet stalls per toilet room).

C103002 TOILET AND BATH ACCESSORIES

This paragraph covers toilet and bath accessories including, but not limited to, soap dispensers, paper holders, towel receptacles, grab bars, and bathroom mirrors.

C103002 1.1 TOILET AND BATH ACCESSORIES

C103002 1.1.1 Toilet Tissue Dispensers

Provide surface or recessed mounted dispensers fabricated of stainless steel. Provide one horizontally or vertically mounted double-roll dispenser per toilet compartment, unless otherwise indicated.

C103002 1.1.2 Paper Towel Dispensers

Provide one per pair of sinks in toilet rooms without electric hand dryers, and one per room with electric hand dryers, unless otherwise indicated. Provide surface or recessed mounted towel dispenser constructed of a minimum 0.7mm 0.03 inch Type 304 stainless steel.

C103002 1.1.3 Combination Paper Towel Dispenser / Waste Receptacle

Provide a recessed or semi-recessed type with a capacity of 400 sheets of C-fold, single-fold, or quarter-fold towel and be constructed of 22-gage stainless steel. Provide one per pair of sinks, unless otherwise indicated. Provide the towel compartment door with a tumbler key lock locking mechanism.

C103002 1.1.4 Sanitary Napkin Disposal Units

Units must be toilet partition or wall mounted of not less than 22 gage stainless steel, with top and bottom hinged access doors. Provide one in each Woman's toilet stall, unless otherwise indicated. Each unit must have leak-proof receptacle for disposable liners. Provide fifty disposable liners of the type standard with the manufacturer.

C103002 1.1.5 Medicine Cabinets

Provide units with plate or float glass mirrors on doors. Provide doors and frames of 16-gage steel with a continuous piano hinge and flush magnetic latch.

C103002 1.1.6 Towel Bars

Provide stainless steel towel bars with a minimum thickness of 0.015 inch (0.4 mm).

C103002 1.1.7 Grab Bars

Provide stainless steel grab bars in accordance wtih DoD ABA Standards.

C103002 1.1.8 Robe Hooks

Provide stainless steel two-hook shape with integral wall flange, with a projection not less than 1-5/8 inches (41 mm).

C103002 1.1.9 Mirrors

Provide one manufactured framed electro-copper plated mirror per sink, or one full-size mirror for all sinks, unless otherwise indicated.

C103002 1.1.10 Soap Dispensers

Provide one soap dispenser per two sinks, with mechanical action dispensing valve. Do not mount soap dispenser on mirror. Surface mounted liquid type must consist of a vertical Type 304 stainless steel tank with holding capacity of 1.2L (40 fluid ounces) with a corrosion-resistant all-purpose valve.

C103002 1.1.11 Electric Hand Dryer

Provide wall mount and electric hand dryer designed to operate at 110/125 volts, 60 cycles, single phase alternating current with a heating element core rating of a maximum 2100 watts. Provide dryer housing of single piece construction and of chrome plated steel. Provide one unit per three sinks, unless otherwise indicated.

C103003 MARKER BOARDS AND TACK BOARDS

This paragraph covers all marker boards, tack boards and fastening devices.

C103003 1.1 MATERIALS

a. Porcelain Enamel - Marker board writing surface must be composed of porcelain enamel fused to a nominal 28 gage thick steel sheet, laminated to a 1/4-inch (6.35 mm) thick core material with a steel or foil backing sheet.
b. Cork must be a continuous resilient sheet made from soft, clean, granulated cork, relatively free from hardback and dust and bonded with a binder suitable for the intended purpose. The cork sheet must have a tensile strength of not less than 40 PSI (275.8 kPa) when tested in accordance with ASTM F 152.
c. Tack-board Covers - Provide woven fabric or vinyl wall covering over cork tack surface.
d. Aluminum - Aluminum frame extrusions must be alloy 6063-T5 or 6063-T6, conform to ASTM B 221, and be a minimum of 0.06 inches (1.5 mm) thick.

C103004 IDENTIFYING DEVICES

This paragraph covers all signs, plaques, and traffic markers.

C103004 1.1 ASSEMBLIES

The signage system assemblies must consist of three primary elements; a structural rail (with coordinating rail joiners to increase sign height in the field), removable copy inserts, and interlocking end caps or frame, and trim.

C103004 1.1.1 Inserts

The signage rails must be designed as to accept ABS plastic signage inserts.

C103004 1.1.1.1 Insert Fabrication

The insert is the signage member to which message signage copy in the form of letters, numbers, and symbols must be applied, and must be interchangeable with similar sized rails of any other sign of equal or greater width and height. The ends of the rail and insert assembly must be enclosed by end caps of prefinished 6064T5 extruded aluminum. Inserts must be fabricated from 0.090 minimum ultra-violet resistant thickness extruded ABS Acrylic sheet core with 20.003 polycarbonate non-glare clear cap bonded to the core during the extrusion texturing process.

C103004 1.1.2 End Caps

End caps must be injection-molded ABS plastic with integral color. The end caps must be interchangeable to either end of each sign type, and any other similar sign of equal height. The end caps must be interlocking mechanically with the inserts, and rail, requiring no tools for assembly. End caps must utilize straight corners (instead of radius corners). Spring clips must be steel. Plastic spring clips are not acceptable.

C103004 1.1.3 Trim

Optional accessory top and bottom trim frames of prefinished (color as indicated) 6063T5 extruded aluminum must be provided to the signage types indicated.

C103004 1.1.4 Mounting

Mounting of the modular signage system must include surface mounting with screw-on applications for interior and exterior walls and on selected doors as indicated, at the locations indicated, and other mounting devices as indicated.

C103004 1.1.5 Graphics Application

a. Tactile Letters and Symbols

Chemically weld tactile letters and symbols to front surface of signage inserts where indicated and where required by DoD ABA Standards. Tactile letters and symbols must be sized as indicated.

b. Braille

Grade II Braille. Provide Grad II Braille inlaid strip as indicated to match sign color.

C103004 1.2 ALUMINUM ALLOY PRODUCTS

Provide ASTM B 209 for aluminum sheet or plate, ASTM B 221 for aluminum extrusions and ASTM B 26/B 26M or ASTM B 108 for aluminum castings. Provide aluminum extrusions at least 1/8-inch (3.2 mm) thick and aluminum plate or sheet at least 16 gage thick. Provide aluminum castings of solid aluminum cast certified by AA 46 alloy designation B443.0. Where anodic coatings are specified, alloy must conform to Aluminum Association's alloy designation 514.0 or A514.0.

C103004 1.2.1 Aluminum Finishes

Provide exposed aluminum finishes with either mill finish, factory finished with anodic coating or organic coating. Anodized finishes must conform to AA 45, Architectural Class I or II, with a coating thickness 0.7 mil or thicker. Organic coatings must be a baked enamel finish with a dry film thickness not less than 1.2 mils, conforming to AAMA 605.2.

C103004 1.3 STEEL PRODUCTS

Provide ASTM A 36/A 36M for structural steel, ASTM A 167 for sheet and plates.

C103004 1.4 CAST METAL

a. Cast Aluminum, ASTM B 108
b. Cast Bronze, ASTM B 62

C103004 1.5 GLASS

ASTM C 1036, Type 1, Class 1, Quality q3

C103004 1.6 FIBER-REINFORCED POLYESTER (FRP)

ASTM D 3841, Type II, Grade 1

C103004 1.7 ACRYLIC SHEET

ASTM D 4802, Type III

C103004 1.8 POLYCARBONATE SHEET

SAE AMS 3611

C103004 1.9 EXTERIOR POST AND PANEL SIGNS

C103004 1.9.1 Posts and Panels

Provide one-piece extruded aluminum posts with not less than 0.125 inch (3.2 mm) wall thickness. Posts must permit attachment of panel framing system. Provide cap for each post. Panel framing system must consist of aluminum extrusions and interlocking track components designed to interlock with concealed fasteners. Panels must be fabricated of rectangular extruded tubular aluminum with a minimum wall thickness of 0.125 inches. Panels must be removable and interchangeable. Posts must be embedded in solid concrete foundation.

C103004 1.9.2 Illumination

Provide concealed lighting within panel framing members. Provide T-12 slim-line lamps,. Ballast must be integrally mounted with high power factor and rated for use in up to minus 20 degrees F (minus 29 degrees C) ambient starting temperature.

C103005 LOCKERS

C103005 1.1 STEEL CLOTHING LOCKERS

C103005 1.1.1 FS AA-L-00486 (Rev J), enameled steel.

Provide ventilated, Single Tier Units (unless multi-tier permitted by Project Program), fully framed. Provide galvanized or galvaneal shelves and bottoms for all lockers, and fully galvanized or galvaneal lockers in locker spaces adjoining shower rooms. Provide full height door stiffeners.

C103006 SHELVING

Assemblies include all types of shelving with brackets and all supporting materials and finish, if required.

C103007 FIRE EXTINGUISHER CABINETS

Cabinet must be constructed of 16 gauge cold-rolled steel door panel / front, and a 22 gauge cold-rolled steel tub. Cabinet must be fire-rated if located in a fire rated wall assembly, and have a full-length piano hinge, and baked enamel finish. Provide a stainless steel cabinet door if cabinet is exposed to the environment. Size and locate fire extinguisher cabinets to encase extinguisher as required by NFPA 10 & 101.

C103008 COUNTERS

C103008 1.1 ACRYLIC COUNTER TOPS

Provide 100% acrylic counter tops for use in non-residential construction.

Solid surfacing material must consist of 100% pure acrylic polymer, mineral fillers, and pigments. The material must be homogenous, not coated or laminated. Superficial damage to a depth of 0.010 inch (.254 mm) must be repairable by sanding or polishing. Install with factory recommended fasteners/adhesives/sealant. Provide the following performance characteristics:

a. Tensile strength, ASTM D 638: 5800 psi minimum
b. Hardness, ASTM D 2583: Barcol Impressor 55 minimum
c. Flammability, ASTM E 84: Class I/A, flame spread 25 maximum; smoke developed 30 maximum
d. Thermal Expansion, ASTM D 696:.00002 in/in/F maximum
e. Boiling water resistance, NEMA LD 3: No effect
f. High temperature resistance, NEMA LD 3: No effect
g. Liquid absorption, ASTM D 570 (24 hours): 0.10 percent maximum
h. Mold and mildew growth, ASTM G 21: No growth, no effect
i. Bacteria growth, ASTM G 22: No growth, no effect
j. Sanitation, NSF 51: "Food Contact" approval for food area applications
k. Impact resistance, NEMA LD 3 (1/2 lb. ball drop): 1/4 inch material, 36 inch drop, no failure 1/2 inch material, 120 inch drop, no failure

C103009 CABINETS

This paragraph includes casework items that are permanently fixed in-place. Included are all cabinetry and millwork items with their associated accessories and anchoring devices.

C103009 1.1 WALL AND BASE CABINETS

Wall and base cabinets must be of the same construction and appearance, with solid ends and frame fronts, or with frames all around. Frames must not be less than 3/4 inch by 1 1/2 inches (19 mm by 38 mm) hardwood. All ends, bottoms, backs, and partitions must be hardwood plywood. Cabinet doors and drawer fronts must be a minimum 3/4 inch (19 mm) hardwood.

C103009 1.1.1 Quality Standards

Wall and base cabinets must be constructed to meet "Custom" quality grade as defined in AWI Quality Standards, except where this specification exceeds AWI Custom.

C103009 1.1.2 Hardware

Provide cabinet hardware including two self-closing hinges for each door and two side-mounted metal drawer slides for each drawer and pulls for all doors and drawers as follows. All cabinet hardware exposed to view must be ANSI/BHMA 156.9, Grade 1, and comply with the following requirements:

a. Concealed Euro-Style, back mounted hinges with opening to 165 degrees and a self-closing feature at less than 90 degrees. Mount to door with plastic insertion dowels and Euroscrews.
b. Full Extention drawer slides must have a static rating capacity of 100 lbs. (444 N).
c. Provide adjustable shelving standards with shelf support hardware for wall cabinets.
d. Provide heavy-duty magnetic latch and door and drawer catch

C103009 1.1.3 Finish

Provide plastic laminate (NEMA LD3) or transparent finish with sealer and varnish as selected by Designer of Record.

C103011 CLOSETS

This paragraph includes all built-in closets with associated work and finishes.

C103012 FIRESTOPPING PENETRATIONS

This paragraph covers fire-stopping assemblies to include sleeves, caulking and flashing. See PTS Section D40, *Fire Protection*, for additional requirements.

C103012 1.1 FIRESTOPPING

Provide firestopping materials, supplied from a single domestic manufacturer, consisting of commercially manufactured, asbestos-free, nontoxic products that are FM Approval Guide approved, or UL listed, for use with applicable construction and penetrating items, complying with the following minimum requirements.

C103012 1.1.1 Fire Hazard Classification

Material must have a flame spread of 25 or less, and a smaoke developed rating of 50 or less, when tested in accordance with ASTM E84 or UL 723. Material must be an approved firestopping material as listed in UL Fire Resistance Directory or by a nationally recognized testing laboratory.

C103012 1.1.2 Toxicity

Material must be nontoxic and carcinogen free to humans at all stages of application or during fire conditions and must not contain hazardous chemicals or require harmful chemicals to clean material or equipment. Firestop material must be free from Ethylene Glycol, Polychlorinated Biphenyl (PCB), Methyl Ethyl Ketone (MEK), or other types of hazardous materials.

C103012 1.1.3 Firestopping Rating

Firestop systems must be UL Fire Resistance Directory listed or FM Approval Guide approved with "F" and "T" rating at least equal to the fire-rating of the fire wall or floor in which penetrating openings are to be protected.

C103012 1.1.3 Through-Penetrations

Firestopping materials for through-penetrations must provide "F", "T", and "L" fire resistance ratings in accordance with ASTM E814 or UL 1479.

C103013 SPRAYED FIRE-RESISTIVE MATERIALS

See PTS Section D40, *Fire Protection*, for additional requirements.

C103013 1.1 SPRAYED FIRE-RESISTIVE MATERIALS

C103013 1.1.1 Quality Assurance

A pre-installation conference must be held with the manufacturer's approved installer prior to the application of the sprayed fire-resistive materials. See Paragraph C10 1.2 for field testing requirements for the fire-resistive material. Products provided must not contain asbestos to comply with 40 CFR 763.

C103013 1.1.2 Warranty

Provide manufacturer's standard materials and workmanship warranty stating that the manufacturer agrees to repair or replace materials that fail within 2 years, or as required by the project program, from date of Substantial Completion.

C103013 1.1.3 Material Composition

Provide sprayed fire-resistive material consisting of factory-mixed, dry formulation of gypsum or Portland cement binders and light-weight mineral or synthetic aggregates mixed with water at the Project site, or provide sprayed-fiber fire-resistive material consisting of factory-mixed, dry formulation of inorganic binders, mineral fibers, fillers, and additives conveyed in a dry state by pneumatic equipment and mixed with water at a spray nozzle to form a damp, as-applied product.

C103013 1.1.4 Physical Properties

a. Dry Density: 15 lb/cubic foot (240 kg/cubic meter) for referenced fire-resistance design to attain the ratings indicated, in accordance with ASTM E 605.
b. Thickness: Provide minimum average thickness required for fire-resistance design indicated according to the following criteria, but not less than 0.375 inch (9 mm), per ASTM E 605:

   1) Where the referenced fire-resistance design lists a thickness of 1 inch (25 mm) or greater, the minimum allowable individual thickness of sprayed fire-restive material is the design thickness minus 0.25 inch (6 mm).

   2) Where the referenced fire-resistance design lists a thickness of less than 1 inch (25 mm) but more than 0.375 inch (9 mm), the minimum allowable individual thickness of sprayed fire-resistive material is the greater of 0.375 inch (9 mm) or 75 percent of the design thickness.

   3) No reduction in design thickness is permitted for those fire-resistance designs whose fire-resistance ratings were established at densities of less than 15 lb/cubic foot (240 kg/cubic meter).
c. Bond Strength: 150 lb/sq. ft. (7.2 kPa) minimum in accordance with ASTM E 736.
d. Compressive Strength: 5.21 lb/sq. in. (35.9 kPa) as determined in accordance with ASTM E 761. Minimum thickness of sprayed

fire-resistive material tested must be 0.75 inch (19 mm) and minimum dry density must be as specified, but not less than 15 lb/cubic foot (240 kg/cubic meter).

e. Corrosion Resistance: No evidence of corrosion in accordance with ASTM E 937.
f. Deflection: No cracking, spalling, or delaminating in accordance with ASTM E 759.
g. Effect of Impact on Bonding: No cracking, spalling, or delaminating in accordance with ASTM E 759.
h. Air Erosion: Maximum weight loss of 0.025 g/sq. foot (0.270 g/sq. meter) in 24 hours in accordance with ASTM E 859.
i. Fire-Test-Response Characteristics: Provide sprayed fire-resistive materials with the following surface-burning characteristics in accordance with ASTM E 84 by United Laboratories: flame-spread index of 10 or less and a smoke developed index of 0.
j. Fungal Resistance: No observed growth on specimens in accordance with ASTM G 21.

C103014 ENTRANCE FLOOR GRILLES AND MATS

Provide entrance mats at all entrances to the facility. Comply with Architectural Barriers Act (ABA) Standards for installed entrance mats and frames. Provide recessed entrance mats at building entrances with enclosed vestibule and surface applied entranceway mats or entranceway floor tiles at all other entrances. Entranceway mats and entranceway floor tile require the use of a transition edge where the mat adjoins other floor materials. Mat system must meet ASTM D-2047 coefficient of friction requirements of minimum 0.60 for accessible routes and be structurally capable of withstanding a uniform floor load of 300 lbs/sq. ft. (14 kPa). All portions of mat system must comply with ASTM E 648, Class I, Critical Radiant Flux, minimum 0.45 watts/m2 for flammability.

C103014 1.1 ROLL-UP MATS

Roll-up mats with tread rails spaced a maximum 2 inch (51 mm) on center and running counter to the traffic flow. Mats must allow debris to fall to sub-floor. Tread rails are connected by aluminum or vinyl hinges, with a continuous noise reducing vinyl cushion and an aluminum or vinyl edge around the perimeter. Roll-up mats must be recessed or surface mounted and provided with tread inserts:

C103014 1.1.1 CARPET INSERTS

Carpet insert fiber must be colorfast, solution dyed, anti-static, anti-microbial, and waterproof. Fiber must be 100% nylon or polypropylene, minimum 30 oz. per square yard. Each carpet fiber must be bonded to rigid ply backing to prevent fraying and supplied in continuous splice-free lengths.

C103014 1.1.2 VINYL OR RUBBER INSERTS

Vinyl or rubber inserts must be removable and be made from recycled materials wherever possible. Inserts must have serrated edges and textured surfaces for scraping purposes, bonded to a rigid vinyl or rubber tread insert.

C103014 1.4 RECESSED MAT THERMOPLASTIC FRAME PROPERTIES

Thermoplastic frame must be colorfast and UV-resistant. Tensile strength of frame must comply with ASTM D 638. Tensile impact of frame must comply with ASTM D 1822. Flexural strength of frame must comply with ASTM D 790. Shore D hardness of frame must comply with ASTM D 2240. Rockwell R hardness of frame must comply with ASTM D 785. Coefficient of thermal expansion of frame must comply with ASTM D 696.

C103014 1.5 RECESSED MAT ALUMINUM FRAME REQUIREMENTS

Aluminum frame and rail must comply with ASTM B 221, alloy 6063-T5. Frame must have butted corners and be factory coated with zinc chromate or manufacturer's standard protective finish where surfaces are in contact with concrete. Provide standard mill finish, color anodized finish complying with AAMA 606.1, clear anodized finish complying with AAMA 607.1, or bronze complying with ASTM B455, alloy 385.

C103014 1.2 RECYCLED RUBBER TIRE TILES AND MATS

Recycled rubber tire tiles and mats must be made from recycled truck, bus and aircraft tires with sidewall cords and buffed to a chenille finish. Product is bonded to woven flexible backing to form 3/8 to 7/16 inch (9.5 to 11.1 mm) thick, 12 inch (300 mm) square tiles or 12 inch (300 mm) wide rolls up to 25 feet (7.5 m) long.

C103014 1.7 SURFACE MOUNTED/LOOSE-LAY ENTRANCE MATS

Loose-lay mats must have beveled vinyl or rubber transition edge and must have surface of carpet or vinyl/rubber surfaces. Edges must conform to ABA Standards. Mats must be easily removed yet remain adhered to floor to prevent mat from moving as pressure from walking is applied.

C103014 1.3.1 RUBBER OR VINYL MATS

Non-slip mats minimum of 3/8 inch (9.5 mm) thick with square edges for recessed installations or beveled edges for surface applications. Mats must be solid sheet (no perforations), perforated style or corrugated style with knob or flat base bottom surface. Provide surface texture to suite project requirements. Ensure mats are a prime quality compound free of calendaring and curing defects and resistant to weather aging and ozone in normal concentrations.

C103014 1.3.2 CARPET TYPE MATS

Nylon or polypropylene carpet bonded to 1/8 to 1/4 inch (3 to 6 mm) thick, flexible vinyl backing minimum3/8 inch (9.5 mm) thick overall. Carpet has anti-static, anti-staining, non-raveling and anti-microbial properties.

C103014 1.10 SURFACE APPLIED ENTRANCEWAY FLOOR TILE

Applied entranceway floor tiles must be in the form of carpet tiles, carpet tiles with vinyl or rubber scrubbing surfaces, or tiles of thermoplastic scrubbing surfaces only. Tiles must be installed in areas where permanent mat is required but slab is not recessed to receive permanent recess mat. Tiles must be securely installed without obvious seams, cleanable,

dimensionally stable, and with maximum finished tile thickness of 1/2" above finished floor line. Carpet fibers must be 100% nylon or polypropylene, anti-static, anti-microbial, colorfast, solution dyed, mold and mildew resistant, and waterproof with minimum face weight of 30 oz/yd2. Thermoplastic only tiles must be PVC free and UV-resistant.

SECTION C20

STAIRS
09/22

C20 GENERAL

RFP Part 3 including the Engineering System Requirements (ESR) provide project specific requirements. The RFP Part 4, Performance Technical Sections (PTS) provide generalized technical requirements that apply to multiple facility types and include more requirements than are applicable to any one project. Therefore, only the RFP Part 4 requirements that apply to the project and further define the RFP Part 3 project specific requirements are required.

C20 1.1 DESIGN GUIDANCE

Provide the design and installation in accordance with the following references. This Performance Technical Specification (PTS) adds clarification to the fundamental requirements contained in the following Government Standards. The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification*.

Industry standards, codes, and government standards that are referenced in the section text that are not found in the Unified Master Reference List (UMRL) in the Federal Facility Criteria (FFC) at the Whole Building Design Guide (WBDG) website, are listed below for basic designation identification. Comply with the required and advisory portions of the current edition of the standard at the time of contract award.

C20 1.1.1 Industry Standards and Codes

AISC American Institute of Steel Construction

C20 1.1.2 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s):
UFC 3-101-01UFC 1-200-02	ArchitectureHigh Performance and Sustainable Building Requirements

C20 1.2 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Provide verification of satisfactory stair performance via Performance Verification Testing, as detailed in this section of the RFP.

C20 1.2.1 Field Testing for Concrete

Field Quality Control Test Reports to be submitted to Designer of Record (DOR) must comply with American Concrete Institute (ACI) 301. If concrete is found to be below the strength required in the tests, remove and replace that concrete and all associated building components at no additional cost to the Government.

C20 1.3 DESIGN SUBMITTALS

Provide design submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, Facilities Criteria (FC) 1-300-09N, *Navy and Marine CorpsDesign Procedures*,and UFC 3-101-01, *Architecture*.

C20 1.4 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with PTS Section Z10, *General Performance Technical Specification*. In addition to the Z10 requirements the Designer of Record (DOR) must approve the following construction submittals as a minimum:

Stairs, handrails.

C2010 STAIR CONSTRUCTION

C201001 INTERIOR AND EXTERIOR STAIRS

Provide primed and painted steel stairs with concrete filled pans or cast-in-place concrete stairs for industrial and commercial construction. Design load must not be less than 100 PSF (4.8 kPa) for live load, and 300 pounds (136 kg) for concentrated loads. Required means of egress stairs must conform to to National Fire Protection Association (NFPA) 101. Provide steel guard and handrails.

C201001 1.1 STEEL STAIRS

Design must conform to AISC S335 or AISC S342L.

C201001 1.1.1 Materials

a. Structural Carbon Steel - American Society for Testing and Materials (ASTM) A 36/A 36M
b. Structural Tubing - ASTM A 500
c. Steel Pipe - ASTM A 47
d. Gratings - Gray cast iron ASTM A 48, Class 40
e. Metal plank grating, non-slip requirement, FS RR-G-1602 aluminum ASTM B 209, 6061-T6; steel ASTM A 653/ A 653M, G90.
f. Floor Plates, Patterned - ASTM A 786/A 786M, 14 gage.
g. Anchor Bolts - ASTM A 307
h. Galvanized Structural Steel - All steel exposed to the environment or direct water contact must be galvanized in accordance with ASTM A 123 /A123M, ASTM A153/A153M, and ASTM A653/A653M, Z275 (G90) coating. Galvanize all components after fabrication in accordance with ASTM A385. Fabricate all steel components in the largest units practical using bolted

connections for field assembly. Repair damage to, or voids in, galvanizing in accordance with ASTM A780, Annex A1 or Annex A3.

C201001 1.2 ALUMINUM ALLOY PRODUCTS

Conform to ASTM B 209 for sheet plate, ASTM B 221 for extrusions and ASTM B 26/B 26M or ASTM B 108 for castings. Aluminum extrusions must be at least 1/8-inch (3.2 mm) thick and aluminum plate or sheet at least 0.050 inch (1.27 mm) thick.

C201001 1.3 FINISHES

C201001 1.3.1 Galvanizing

Hot-dip galvanizing: ASTM A 123/A123M, ASTM A 153/A 153M or ASTM A 653/A 653M, G90, as applicable.

C201001 1.3.2 Aluminum Finishes

Protect by plating, Class I anodic coatings, or 70% polyvinylidene fluoride organic coatings. See PTS Section C30, *Interior Finishes*, for additional coatings/finish information.

C201001 1.3.3 Safety Treads

NAAMM BG steel, Type W (welded).

C201001 1.3.4 Other Coatings

See PTS Section C30, *Interior Finishes*, for painted finishes.

C201001 1.4 CONCRETE STAIRS / STEPS

Provide interior or exterior concrete steps and stair with non-slip finish. For interior stairs, provide rubber or other finish treads. For exterior stairs, provide cast-in-place abrasive nosing. Provide steel guard and handrails as necessary. Fire stairs must comply with NFPA 101.

C201001 1.4.1 Materials

a. Concrete - ACI 211.1, ACI 301/301M, and ACI 318/318M, with a compressive strength of 3,000 psi (20,680 kPa) or greater. Concrete Mix Design shall be suitable for the job conditions.
b. Reinforcements - Bars, fabrics, connectors, and chairs must be galvanized.
c. Reinforcing Bars - ACI 301/301M
d. Welded Wire Fabric - ASTM A 185 or ASTM A 497
e. Cast Aluminum Safety Nosings – For exterior concrete stairs, provide safety nosings of cast aluminum with abrasive surfaces or with abrasive inserts.

C201090 STAIR HANDRAILS, GUARDRAILS, AND ACCESSORIES

C201090 1.1 HANDRAILS

Design handrails in accordance with the International Building Code

(IBC), except delete the handrail design load reduction code exceptions for residential, prisons, industrial, high hazard, and storage facilities. NAAMM Pipe Railing Systems Manual, provide the same size rail and post. Provide series 300 stainless steel pipe collars. Factory coat all metal railings (except for ornamental metals such as brass, bronze, stainless steel, and nickel-silver) with a high performance coating in accordance with American Architectural Manufacturers Association (AAMA) 2605, with a minimum coating thickness of 1.2 mils unless otherwise noted.

C201090 1.1.1 Steel Handrails

Provide steel handrails, including inserts in concrete, steel pipe conforming to ASTM A 53 or structural tubing conforming to ASTM A 500, Grade A or B of equivalent strength. Railings must be hot-dip galvanized and shop painted for exterior applications and primed and shop painted for interior applications. Railing may be unpainted hot-dip galvanized in industrial areas.

C201090 1.1.2 Aluminum Handrails

Provide aluminum pipe railing conforming to ASTM B 429 or square aluminum semi-hollow tube conforming to ASTM B 221. Railings must be coated with a high performance coating or anodized in accordance with AAMA 611, Class I.

SECTION C30

INTERIOR FINISHES
09/22

C30 GENERAL

RFP Part 3 including the Engineering System Requirements (ESR) provide project specific requirements. The RFP Part 4, Performance Technical Sections (PTS) provide generalized technical requirements that apply to multiple facility types and include more requirements than are applicable to any one project. Therefore, only the RFP Part 4 requirements that apply to the project and further define the RFP Part 3 project specific requirements are required.

All interior finish products must be from manufacturers' standard running line offerings. Custom fabrications are not permitted unless otherwise noted.

C30 1.1 DESIGN GUIDANCE

Provide the design and installation in accordance with the following references. This Performance Technical Specification (PTS) adds clarification to the fundamental requirements contained in the following Government Standards. The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification*.

Industry standards, codes, and Government standards referenced in the section text that are not found in the Unified Master Reference List (UMRL) in the Federal Facility Criteria (FFC) at the Whole Building Design Guide (WBDG) website, are listed below for basic designation identification. Comply with the required and advisory portions of the current edition of the referenced standard at the time of contract award.

C30 1.1.1 Industry Standards And Codes

FLOOR COVERING INSTALLATION CONTRACTOR'S ASSOCIATION (FCICA)

FLOOR COVERING INSTALLATION BOARD (FCIB)

TILE COUNCIL OF NORTH AMERICA (TCNA)

C30 1.1.2 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s):UFC 3-101-01, ArchitectureUFC 3-120-10, Interior Design)
UFC 1-200-02	High Performance and Sustainable Building Requirements

C30 1.2 DESIGN SUBMITTALS

Provide design submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, Facilities Criteria (FC) 1-300-09N, *Navy and Marine CorpsDesign Procedures,*UFC 3-101-01, *Architecture and UFC 3-120-10, Interior Design*.

In addition, UFGS sections listed below or in the body of the PTS text are to be used by the Designer of Record (DOR) as a part of the design submittal. If the UFGS products or systems are applicable to the project, the DOR must edit these referenced UFGS sections and submit them as a part of the design submittal specification. Edit the specification sections in accordance with the limitations stated in PTS Section Z10, *General Performance Technical Specifications*.

Changes must not be made to the finishes that are submitted in the plans, specifications, and Structural Interior Design submittals and approved by the Government during the design phase unless changes are requested by the Government. In the event that revisions may be required because of unforeseen conditions such as discontinued product, the revisions must be approved by the DOR and then submitted to the Government Interior Designer for approval before substitutions can be made.

C30 1.3 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*. In addition to the Z10 requirements, the Designer of Record (DOR) and the NAVFAC Interior Designer must approve the following construction submittals as a minimum:

Paint, Finish materials, Finish colors

Installation drawings for floors with carpet, tile, stone, architectural cast-in-place concrete or terrazzo to include locations and details of seams, color and material transitions, details of divider strips, control joints, and crack control solutions.

Changes must not be made to the finishes that are submitted and approved by the Government during the design phase. In the event that revisions may be required because of unforeseen conditions such as discontinued product, the revisions must be approved by the DOR and then submitted to the Government Interior Designer for approval before substitutions can be made.

C3010 WALL FINISHES

Provide moisture and mildew resistant interior wall finishes which are easily maintained, and suitable in accordance with industry standards for the architectural surface being finished. For painted wall finishes, refer to C3040 "INTERIOR PAINTING AND SPECIAL COATINGS".

C301001 CONCRETE WALL FINISHES

C301001 1.1 SPECIAL OR ARCHITECTURAL FINISHES ON INTERIOR CONCRETE WALLS

Cast-in-place or pre-cast concrete wall finishes include, but are not limited to, abrasive blasted surfaces, colored surfaces, exposed aggregate, grooved surfaces, or tooled surfaces.

C301002 PLASTER WALL FINISHES

Veneer plaster must be cement plaster veneer finish on concrete or masonry. Refer to Section C3040 for paint system and gloss level.

C301002 1.1 CEMENT PLASTER

C301002 1.1.1

Portland cement plaster base coat in accordance with ASTM C150, gray Portland cement. Use Type I when no special characteristics are required, Type II when plaster and stucco will be exposed to moderate sulfate (alkali) action, Type III when early strength is needed as in cold weather, and Type V when high resistance to sulfate is required.

C301002 1.1.2

Portland cement plaster finish coat in accordance with ASTM C150, gray Portland cement Type I when no special characteristics are required, Type II when plaster and stucco will be exposed to moderate sulfate (alkali) action, Type III when early strength is needed as in cold weather.

C301002 1.1.3

Factory-mixed finish coat according to the manufacturer's instructions.

C301002 1.2 ACRYLIC PLASTER COATING

High Performance (impact resistant) seamless interior acrylic coating system must be used as an interior wall finish over CMU that has been joint filled and smoothed with a water resistant manufactured recommended compound. Coating system to be mold and mildew resistant, have a minimum Barcoll Hardness Index of 38 and flame spread 15 or less per ASTM-E84 and have a minimum final film thickness of higher than 10 mils. Coating system must have been on the market and successfully used in commercial applications for a minimum of 10 years. Coating system must be applied by a manufacturer's factory trained applicator/installer.

C301003 GYPSUM WALLBOARD FINISHES

Conform to specifications, standards and requirements in accordance with Gypsum Association GA 214, GA 216 and GA 224. Provide asbestos free materials only. Provide Type X gypsum board in fire rated assemblies. Provide a foil back gypsum board when a vapor retarder is required.

C301003 1.1 MOISTURE RESISTANT GYPSUM BOARD

ASTM C630/C630M, 1/2 or 5/8 inch (12.7 mm or 15.9 mm) thick in residential construction, and 5/8 inch (15.9 mm) thick in non-residential construction. Use in humid areas or spaces but not as a substrate in tiled areas where wall tile is exposed to direct moisture contact or condensation accumulation.

C301003 1.2 CEMENTITIOUS BACKING UNITS

Provide cementitious backer units, 1/2 inch (12 mm) thick, in accordance with Tile Council of North America Handbook; use as a substrate for ceramic tile in wet areas that are exposed to direct moisture contact or condensation accumulation for areas including, but not limited to, tubs, shower enclosures, saunas, steam rooms, gang shower rooms, and shower drying rooms. Provide screws specifically designed for use with cement panels.

C301003 1.3 IMPACT RESISTANT GYPSUM BOARD

Reinforced gypsum panel with imbedded fiber mesh or polycarbonate resin thermoplastic backing, 5/8 inch (15.9 mm) thick, tapered edges, in accordance with Structural Failure Test; ASTM E695 or ASTM D2394 and Indentation Test; ASTM D5420 or ASTM D1037. Provide metal framing of 20-gauge minimum. Provide fasteners that meet manufacturer requirements and specifications. Impact resistant gypsum board must have a flame spread rating of 25 or less and a smoke developed rating of 50 or less, ASTM E84. Finish with a high strength plaster veneer. Refer to PTS C10 for further requirements on impact resistant wall construction.

C301003 1.4 JOINT TREATMENT

ASTM C475, Joint compound must be specifically formulated and manufactured for use with and compatible with tape, substrate and fasteners as recommended by the manufacturer. Tape and finish gypsum board in accordance with ASTM C840, GA 214 and GA 216. Provide premanufactured joints at all structural expansion joints, crack control joints, and change of materials as recommended by the manufacturer and in accordance with GA 216.

C301003 1.5 FASTENERS

ASTM C514. Fasteners must be compatible with each type of gypsum board material as recommended by the gypsum board manufacturer and in accordance with GA 216 and GA 224.

C301003 1.6 ACCESSORIES

ASTM C1047. Fabricate from corrosion protected steel or plastic designed for intended use. Accessories manufactured with paper flanges are not acceptable. Flanges must be free of dirt, grease, and other materials that may adversely affect bond of joint treatment.

C301003 1.7 LEVEL OF FINISH

C301003 1.7.1

Tape and finish gypsum board in accordance with ASTM C840, GA 214 and GA 216. Plenum areas above ceilings must be finished to GA 214, Level 1. Water resistant gypsum backing board, ASTM C630/C630M, to receive

ceramic tile must be finished to GA 214, Level 2. Walls to receive a heavy-grade wall covering or have textured finish before painting must be finished to GA 214 Level 3. Walls without wall wash lighting to receive paint (MPI Gloss Level 2), light textures, or wall coverings must be finished to GA 214 Level 4. Unless otherwise specified, all gypsum board walls, partitions must be finished to GA 214 Level 5. Provide joint, fastener depression, and corner treatment. Do not use fiberglass mesh tape with conventional drying type joint compounds; use setting or hardening type compounds only. Provide treatment for water-resistant gypsum board as recommended by the gypsum board manufacturer.

C301003 1.7.2

Wherever gypsum board is to receive eggshell (MPI Gloss Level 3), semigloss (MPI Gloss Level 5), or gloss (MPI Gloss Level 6) paint finish, finish gypsum wall surface to GA 214 Level 5.

C301003 1.7.3

Where wall wash lighting will accent the flatness of the wall and surface irregularities in gypsum board joints, provide feature edge gypsum board and two coat joint compound fillers. Provide this special joint treatment at up lighting, down lighting and horizontal lighting at the end of a passageway wall.

C301004 TILE AND TERRAZZO WALL FINISHES

C301004 1.1 CERAMIC TILE WALL SYSTEM FINISHES

Provide ceramic tile wall systems as defined in the Tile Council of North America (TCNA) handbook for ceramic tile installations suitable for the service requirements listed. Install systems in accordance with Tile Council of North America Handbook and American National Standards Institute (ANSI) A108/A118 series standards. Colored epoxy grout with sealer must be provided. Coordinate with ceramic bath accessories for modularity. Include all trim pieces, caps, stops, and returns to complete installation.

C301004 1.1.1

Ceramic Mosaic Wall Tile must be a minimum of 1/4 inch (6 mm) thick and installed from floor to ceiling, unless otherwise noted.

C301004 1.1.2

Wall tile must be glazed, matte glazed or unglazed finish. Refer to project program for tile type, pattern, and surface texture.

C301004 1.1.3

Porcelain wall tile must be through color, polished or unpolished. Refer to project program for tile type, pattern, and surface texture.

C301004 1.1.4

Provide wall tile color and style selections a minimum of one grade

above base grade.

C301004 1.1.5

Provide Designer accent tile, accent strips and accessory ceramic tile shapes as an integral part of the ceramic wall tile system.

C301090 OTHER WALL FINISHES

C301090 1.1 SOLID SURFACING WALL FINISHES

Solid surfacing material must consist of 100% pure acrylic polymer, mineral fillers, and pigments. The material must be homogenous, not coated or laminated, meeting ANSI Z124.3 and ANSI Z124.6 requirements. Superficial damage to a depth of 0.010 inch (.254 mm) must be repairable by sanding or polishing. Provide manufacturer's full range of colors and patterns. Flammability, ASTM E84: Class I/A, flame spread 25 maximum; smoke developed 30 maximum.

C301090 1.1.1

If used in a shower, solid surfacing wall finishes must extend from top of shower pan to a minimum of 84 inches (2130 mm) or to underside of ceiling and must surround the shower enclosure. If used in a kitchen, solid surfacing wall finish must extend from top of kitchen countertop to underside of wall cabinet.

C301090 1.1.2

Provide solid surfacing with factory recommended fasteners/adhesives/caulk to complete the installation.

C3020 FLOOR FINISHES

Refer to C3040 "INTERIOR PAINTING AND SPECIAL FINISHES" for painted floor coatings.

C3020 1.1 RESILIENT SUBFLOOR PREPARATION

Have third party independent concrete slab testing agent verify that concrete slabs comply with ASTM F710. Minimum values must not be below the following: Concrete floor flatness must meet minimum flatness of FF 60 when tested in accordance to ASTM E1155 - 96(2008). Concrete levelness on slab on grade must meet minimum levelness of FL 45 when tested in accordance with ASTM E1155 - 96(2008). This requirement does not apply to elevated concrete slabs.

C3020 1.1.1 Floor Preparation

Prior to installation of flooring materials the concrete sub-floors are to be dry, free of curing compounds, sweeping compounds, sealers, hardeners, and other materials which could interfere with bonding of adhesive. If curing compounds, sweeping compounds, bond breakers or sealers exist, they must be completely removed by mechanical means and methods, specifically grinding and shot blasting of concrete surface as necessary. Determine adhesion and dryness characteristics by performing bond and moisture tests. Prior to building being

conditioned, perform a preliminary moisture test using in situ probe relative humidity testing as specified per ASTM F 2170.

C3020 1.1.2 Testing

All pre-installation moisture testing is to be performed by a qualified independent testing agency. Perform the following test as soon as building is enclosed, watertight, and conditioned, and a minimum of two months prior to floor covering installation.

a. Moisture Testing: Perform moisture and pH tests as recommended by the flooring and adhesive manufacturers. Perform test starting on the deepest part of the concrete structure. Proceed with installation only after concrete substrates meet or exceed floor covering manufacturer's requirements. In the absence of specific guidance from the flooring manufacturer the following must be the required minimum:

b. Perform concrete internal relative humidity testing using in situ probes in accordance with ASTM F 2170. Proceed with installation only after concrete reaches maximum 75 percent relative humidity level measurement.

C3020 1.1.3 Additional Preparation

If tested moisture levels exceed the allowable limits, shot blast the concrete subfloors to including grinding of areas not accessible to shot blasting equipment and install a 100% solids VOC free epoxy moisture and pH control system as recommended by the third party testing agent.

a. Install cement based self-leveling underlayment over epoxy moisture and pH control system to create a smooth substrate suitable for floor covering and approved by floor covering manufacturer for use with their products.

b. Correct conditions that will impair proper installation.

c. Fill cracks, joints and other irregularities in concrete with leveling compound.

d. Do not use adhesive for filling or leveling purposes.

C3020 1.1.4 Final Cleaning Prior to Flooring Finish Installation

Clean floor of oil, paint, dust, and deleterious substances. Leave floor dry and cured free of residue from existing curing or cleaning agents.

C302001 TILE FLOOR FINISHES

Provide ceramic tile floor systems as defined in the Tile Council of North America (TCNA) handbook for ceramic tile installation and materials for the service requirements listed. Provide installation and materials in accordance with ANSI A108/A118 series standards, except do not use organic adhesives. Provide manufacturer’s full range of colors and styles. Tile must be a minimum of two grades above base grade.

Mortar must be Portland cement, ANSI A108.1A/1B/1C/ A118.1, Latex-Portland cement, ANSI A108.5/A118.4 or Epoxy ANSI A108.6/A118.3.

Grout must be factory sanded Portland cement, ANSI A108.10/A118.6, Latex-Portland cement, ANSI A108.10/A118.7 or Epoxy ANSI A108.6/A118.3. Provide tile joint grout sealer on white, light colored areas that are routinely exposed to water and liquid cleaning materials, entrance areas, and areas that require a high degree of stain resistance, and as required by the manufacturer. Provide chemical resistant epoxy resin for kitchens and other areas where high resistance to staining and absorption are required, ANSI A118.3.

Slip resistant tile must have a minimum Dynamic Coefficient of Friction (wet and dry) of 0.42, ANSI A137.1-2012. Tile must have smooth, non-slip or textured surface and a glazed or unglazed finish. Non-slip or textured surface required for tile in areas where there is excessive water or grease and oils such as kitchens, dining facilities, shower rooms, toilets, and in industrial and maintenance facilities.

C302001 1.1 CERAMIC GLAZED FLOOR TILES

Ceramic glazed floor tiles shall be a minimum of 5/16 inch (8 mm) thick with a minimum of 1/8 inch (3 mm) grout width with cushioned edge. Tile shall have a 0.5 to 3.0 percent water absorption rate, ASTM C373. Do not use in areas where there is excessive water or grease and oils such as kitchens, dining facilities, toilets, showers, shower drying rooms, building entrance areas, and in industrial and maintenance facilities.

C302001 1.2 CERAMIC MOSAIC UNGLAZED FLOOR TILES

Ceramic Mosaic unglazed floor tiles must be a minimum of 1/4 inch (6 mm) thick with a maximum of 1/16 inch (1.6 mm) grout width with cushioned edge. Tile must have less than a 0.5 percent water absorption rate, ASTM C373.

C302001 1.3 PORCELAIN FLOOR TILE

Porcelain floor tiles must be a minimum of 5/16 inch (8 mm) thick with a maximum of 1/4 inch (6 mm) grout width with cushioned edge. Tile must have a minimum breaking strength of 300 pounds (202 kg), ASTM C648 and a maximum absorption rate of 0.5%, ASTM C373. Tile must be color through, impervious, unglazed or glazed finish with an unpolished, semi-polished, polished, or textured surface.

C302004 RESILIENT FLOOR FINISHES

All resilient flooring must meet or exceed applicable Architectural Barriers Act (ABA) Standards horizontal requirements. Install each type of flooring with recommended adhesive in accordance with the manufacturers' written instructions. Installers must be approved by the manufacturer in writing and must have a minimum of 3 yrs experience for each type of flooring to be installed. Provide and store a minimum of 2% total quantity for each type flooring, color and pattern within each building for future replacement and patching. Provide manufacturers full line of color and pattern selections, including multi-color patterns. Use the resilient floor finishes as identified in the Project Program or as directed below.

C302004 1.1 RESILIENT TILE FLOORING SYSTEM

C302004 1.1.1

Resilient solid vinyl tile/plank must be 0.1 inch (2.5 mm) thick, with a vinyl wear layer of 0.040 inches (1.mm) and must be planks or square tiles. It must include a protective urethane finish for ease of maintenance and conform to ASTM E648, Type III, Class 1 and ASTM F1700, Class III. Provide vinyl flooring that is easily cleaned with off-the-shelf products. Surface finishes requiring manufacturer supplied or special order cleaning solutions are not acceptable. Vinyl flooring must have a marble, granite, stone, terrazzo or wood grain pattern. A manufacturer's 25-year min warranty is required. Products must meet the Buy American Act and be manufactured in ISO 9001 and ISO 14001 compliant factories.

C302004 1.1.2

Resilient vinyl composition tile (VCT) must be commercial grade, asbestos free, with a nominal overall gauge of 1/8 inch (3 mm) and a wear layer thickness of 1/8 inch (3 mm) nominal. The tile must be manufactured in accordance with ASTM F 1066, Type II, Comp. 1, Class 2, through pattern. Tile must be finished in accordance with manufacturer’s written instructions.

C302004 1.1.3

Resilient linoleum tile must be made with natural raw materials including linseed oil, flour, and rosin or resin binders double calendared onto synthetic jute backing, ASTM F2034, Type I. Pattern and color must extend throughout thickness of material. Gage must be 0.10 inch (2.5 mm). Static load limit must be 250 psi per ASTM F970. Seal linoleum using manufacturer's recommended sealer for commercial application. The manufacturer's technical representative must review and approve each typical sample application on-site prior to resuming the installation and must spot check each 1,196 square yards (1000 square meters) for quality control. Work must not commence on any portion of work until the manufacturer's technical representative renders approval on site. A manufacturer's 5-year warranty is required.

C302005 CARPETING

C302005 1.1 GENERAL

Installer(s) must be approved by the manufacturer in writing. Carpet manufacturer must be established and in good standing with the industry. A minimum of 5% total quantity for each color and pattern must be provided and stored within the building for future replacement patching.

C302005 1.2 CARPET PILE FIBER

Provide one of the following:

a. 100% premium branded, yarn-dyed, Type 6.6 continuous hollow filament nylon
b. 100% premium branded, solution-dyed, Type 6 or Type 6.6 continuous hollow filament nylon
c. 100% premium branded, combination yarn dyed and solution-dyed, Type

6 or Type 6.6 continuous hollow filament nylon

C302005 1.3 CARPET BACKING REQUIREMENTS

a. Provide manufacturer's standard high performance carpet backing.
b. Moisture resistant carpet backing must pass the 24-hour British Spill Test.
c. Moisture proof carpet backing must pass the 10,000 Impacts Test.
d. Provide moisture resistant carpet backing with an attached urethane cushion, minimum 18 lb. density.
e. Provide moisture proof carpet backing with integral high density cushion of thermoplastic, urethane, or PVC.

C302005 1.4 CARPET PERFORMANCE CHARACTERISTICS

a. Flammability: Carpet must meet the Critical Radiant Flux Classification of not less than 0.45 W/sq. cm. when tested in accordance with ASTM E648. Carpet must generate less than 450 rating when tested in accordance with ASTM E662
b. Static Control: Carpet must include a permanent static control system to control static build-up to less than 3.0 KV in accordance with AATCC-134.
c. Dimensional Stability: Carpet must be permanently dimensionally stable with no delamination of components or any edge raveling or zippering. Edge Ravel: Minimum 1 lb. loop pile only - ASTM D-7267; Delamination: Minimum 3.5 lb. per inch of width - ASTM D-3936; Tuft Bind: Minimum 10 lb. average tuft bind for loop pile - ASTM D-1335; Tuft Bind: Minimum 8 lb. average tuft bind for (Modular Tile) loop pile - ASTM D-1335.
d. Colorfastness to Crocking: Not less than 4, wet and dry, per AATCC-165.
e. Colorfastness to Light: Not less than 4 after 40 AFU (AATCC fading units) per AATCC-16.
f. Antimicrobial Activity: Not less than 0.08-inch (2-mm) halo of inhibition for gram-positive bacteria; not less than 0.04-inch (1-mm) halo of inhibition for gram-negative bacteria; no fungal growth, per AATCC-174.
g. Appearance Retention: Provide carpet with a medium scale (>3" repeat) or large scale (>6" repeat), multi-color pattern for excellent appearance retention and soil hiding characteristics. Heathered yarn without a pattern is unacceptable unless approved by the NAVFAC Interior Designer as an accent carpet.
h. Sustainability: Provide carpets with recycled fiber content, and renewable material content in the attached cushion or backing materials certified by an independent testing agency. Recycle Content of the Total Product Weight: Must be either Pre-consumer or Post-consumer content or a combination of these. Broadloom: minimum of 10%; Modular Tile: minimum of 30%.
i. Product Sustainability Certification: To achieve superior performance in multiple environmental attribute areas, carpet must have third party certification in accordance with NSF/ANSI 140 Sustainable Carpet Assessment Standard at a "Gold" level minimum. Carpet manufacturer must supply certificate as part of the procurement documentation.
j. Indoor Air Quality: Provide carpets that meet the criteria of the CRI "Green Label Plus" Indoor Air Quality Testing Program. Carpet adhesive VOC's must be less than 50 g/L..

k. Reclamation of existing carpet to be determined with potential vendor. When carpet is replaced, submit certification documentation from the reclamation facility to the Contracting Officer.
l. Written Warranty: Lifetime commercial warranty for texture retention and edge raveling, zippering, de-lamination is required. Seam preparation and adhesives must be recommended by the carpet manufacturer in accordance with the warranty. Submit a copy of the manufacturer's standard warranty to the Contracting Officer within 60 days of BOD. Government must be a beneficiary of the terms of this warranty.
m. Texture Appearance Retention Rating (TARR): The carpet should be evaluated using ASTM D-5252, Hexapod Drum Test, as the commercial carpet test procedure and TARR classification determined by ASTM D-7330. Carpet must meet TARR ratings specified below:

Space Definition	Traffic Classification	TARR Classification
Private Offices	Moderate	> 3.0 TARR
Training, Conference, etc.	Heavy	> 3.0 TARR
Open Office, Corridors, Lobbies, etc.	Severe	> 3.5 TARR

C302005 1.5 CARPET INSTALLATION

Install carpet by one of the following methods in accordance the manufacturer's recommendations and in accordance with the Carpet and Rug Institute, CRI-104, Standard for Installation Specification of Commercial Carpet, compatible with the construction, backing, and pattern characteristics of each carpet provided.

a. Direct Glue Down Carpet Installation
b. Double Glue Down Carpet and Pad Installation
c. Carpet with Attached-Cushion Installation
d. Preapplied releasable "dry" adhesive system installation.
e. Stretch-In Carpet Installation with tack strips and pad

C302007 WALL BASE FINISHES

Provide a wall base for transition between floor and wall finish. If no other type of base is required, provide rubber straight base at carpet installations, rubber cove base at exposed concrete or resilient tile floors, and a base to match the floor material at hard surface tile floors, or as required in the project program.

C302007 1.1 RESILIENT WALL BASE FINISHES

C302007 1.1.1

All rubber wall base must be 4 inch (100 mm) high and 1/8 inch (3.2 mm) thick as required unless indicated otherwise. The wall base must include inside and outside corners and must conform to ASTM F1861-98, Type TS. Provide wall base in rolls and not 4 foot lengths.

C302007 1.2 TILE BASE FINISHES

Coordinate tile base with ceramic wall and floor tile for color, material match and modularity. Include all pre-manufactured trim pieces, special shapes, caps, stops, and returns to provide a complete installation. Provide coordinating wall, base and floor tile for curb construction at showers.

C302008 STAIR FINISHES

C302008 1.1 RESILIENT STAIR TREADS, RISERS AND LANDINGS

Refer to C302004 for resilient landing finishes. Provide rubber risers to match treads or one-piece tread/risers. Provide treads with raised patterns and visually impaired nosing inserts as required.

C302010 HARDENERS AND SEALERS

C302010 1.1 HARDENED AND SEALED CURE CONCRETE FLOORS

Harden and seal concrete floors in accordance with the finished floor manufacture requirements. Utilize other methods of concrete curing if the floor finish manufacturer does not recommend a chemical hardener or sealer. Concrete floors that can utilize a hardener-sealer and will be exposed to traffic must receive a minimum of two coats of hardener-sealer curing agent for dust protection. These hardener-sealer-cured floors must be finished with a curing agent that must penetrate the concrete to permanently seal the floor against moisture and the penetration of contaminants. The curing agent must be non-toxic, non-flammable, and non-combustible and must be installed in accordance with the manufacturer’s printed instructions. The finished floor must be dust-free.

C302010 1.2 COLORED CONCRETE FLOORS

Colored concrete floors must have a concrete topping with integral color pigment. Concrete floor must be trowel applied in a pattern, or must include grit for slip resistance.

C3030 CEILING FINISHES

Refer to C3040 "INTERIOR PAINTING AND SPECIAL COATINGS" for painted ceiling finishes.

C303002 GYPSUM WALLBOARD CEILING FINISHES

Conform to specifications, standards and requirements in accordance with Gypsum Association GA 214, GA 216 and GA 224. Provide asbestos free materials only. Provide featured edge gypsum board on all gypsum surfaces that flatness of joints will be visible, such as up-lighted ceilings, window lighted ceilings, and as recommended by the manufacturer. Provide Type X gypsum board in fire rated assemblies.

C303002 1.1 REGULAR GYPSUM BOARD

ASTM C36/C36M and ASTM C1396/C1396M, 1/2 or 5/8 inch (12.7 mm or 15.9 mm) thick, tapered edge. Provide 5/8 inch (15.9 mm) for all projects except for single family residential, which may utilize 1/2 inch (12.7 mm) if other requirements, such as sound control, are met.

C303002 1.2 MOISTURE RESISTANT GYPSUM BOARD

ASTM C630/C630M, 5/8 inch (15.9 mm) thick, tapered edges. Use for ceilings in humid areas. Do not use as a substrate in tiled areas where tile ceiling will be exposed to direct moisture contact or condensation accumulation. Support moisture resistant gypsum board at 12 inches (305 mm) on center. Provide 5/8 inch (15.9 mm) for all other projects.

C303002 1.3 CEMENTITIOUS BACKING UNITS

ANSI A108.11 and ANSI A118.9, 1/2 or 5/8 inch (12.7 mm or 15.9 mm) thick; use for adhesive applied ceramic tile in wet areas (tubs, shower enclosures, saunas, steam rooms, gang shower rooms, or for shower areas with a veneer plaster finish. Support cementitious backing units at 12 inches (305 mm) on center. Provide screws specifically designed for use with cement panels.

C303002 1.4 JOINT TREATMENT

ASTM C475, Joint compound must be specifically formulated and manufactured for use with and compatible with tape, substrate and fasteners as recommended by the manufacturer. Tape and finish gypsum board in accordance with ASTM C840, GA 214 and GA 216. Provide premanufactured joints at all structural expansion joints, crack control joints, and change of materials as recommended by the manufacturer and in accordance with GA 216.

C303002 1.5 FASTENERS

ASTM C514, Fasteners must be compatible with each type of gypsum board material as recommended by the gypsum board manufacturer and in accordance with GA 216 and GA 224.

C303002 1.6 ACCESSORIES

ASTM C1047, Fabricate from corrosion protected steel or plastic designed for intended use. Accessories manufactured with paper flanges are not acceptable. Flanges must be free of dirt, grease, and other materials that may adversely affect bond of joint treatment. Provide prefinished or job decorated materials. Install as recommended by GA 214, GA 216 and GA 224.

C303002 1.7 LEVEL OF FINISH

C303002 1.7.1

Tape and finish gypsum board in accordance with ASTM C840, GA 214 and GA 216. Ceilings to receive a heavy-grade wall covering or heavy textured finish before painting must be finished to GA 214, Level 3. Ceilings without critical lighting to receive flat paints, light textures, or wall coverings must be finished to GA 214, Level 4. Unless otherwise specified, all gypsum board walls, partitions and

ceilings must be finished to GA 214, Level 5. Provide joint, fastener depression, and corner treatment. Do not use fiberglass mesh tape with conventional drying type joint compounds; use setting or hardening type compounds only. Provide treatment for water-resistant gypsum board as recommended by the gypsum board manufacturer.

C303002 1.7.2

Wherever gypsum board is to receive eggshell, semigloss or gloss paint finish, or where severe, up or down lighting conditions occur, finish gypsum wall surface to GA 214 Level 5. In accordance with GA 214 Level 5, apply a thin skim coat of joint compound to the entire gypsum board surface, after the two-coat joint and fastener treatment is complete and dry.

C303003 PLASTER CEILING FINISHES

C303003 1.1 VENEER PLASTER CEILING FINISHES SYSTEM

Veneer plaster ceilings must be gypsum plaster veneer finish to gypsum base finishes. Refer to Section C3040 for paint system and gloss level. Provide gypsum neat plaster, gypsum ready-mixed plaster, or high strength gypsum plaster base coat conforming to ASTM C28. High strength gypsum plaster must have a compressive strength of not less than 2,500 psi, when tested dry in accordance with ASTM C472.

C3040 INTERIOR COATINGS AND SPECIAL FINISHES

Apply coatings directly to all non-prefinished surfaces of the interior construction. Comply with Master Painters Institute requirements for surface degradation analysis, surface preparation, paint and coating selection, paint application restrictions for substrate materials, and paint application.

C304001 GENERAL REQUIREMENTS

All paint must be suitable in accordance with the Master Painter Institute (MPI) standards for the interior architectural surface being finished. The current MPI, "Approved Product List" as of the date of contract award, will be used to determine compliance with the submittal requirements of this specification. The Contractor may choose to use a more current MPI "Approved Product List"; however, only one list may be used for the entire contract. All coats on a particular substrate, or a paint system, must be from a single manufacturer. No variation from the MPI Approved Products List is acceptable.

Select paint systems for the project in accordance with the MPI Architectural Painting Decision Tree available on the Whole Building Design Guide. Use this interactive MPI Decision Tree website to identify applicable paint system(s) for the project. The MPI Decision Tree identifies paint systems for each interior or exterior coated surface in "Normal" or "Aggressive" environmental conditions and generally lists the applicable paint systems in descending order of performance. The paint system at the top of each substrate list generally indicates the highest performing acceptable coating system.

Choose the "Aggressive" environmental conditions in the MPI Decision Tree for exterior systems that are used in moist humid conditions, abrasive conditions,

chemical exposure conditions, or within five miles proximity of the ocean or a body of water. Also use "Aggressive " environmental conditions in interior spaces that are exposed to in moist humid conditions, abrasive conditions, chemical exposure conditions, such as bathrooms, shower rooms, kitchens, chemical storage area, swimming pools, laundry, sanitary areas, commercial kitchens, industrial production areas, and hospital operating rooms provide paint systems that comply with the MPI Decision Tree "Aggressive" environmental conditions.

Comply with the following rules when determining the appropriate paint or coating system from the MPI Decision Tree:

a. Some of these paint systems are identified with a "NAVFAC Anchor". This "NAVFAC Anchor" indicates the minimum performing system that NAVFAC will accept for that substrate and environmental conditions.

b. When multiple "NAVFAC Anchors" are indicated on a certain substrate and environmental condition, provide the "NAVFAC Anchor" paint or coating system that is most appropriate for the facility use.

c. If only one MPI Decision Tree choice is available for a certain substrate and environmental condition with no indicated NAVFAC preference, provide that sole option for NAVFAC projects.

d. If the MPI Decision Tree provides multiple choices and no NAVFAC preference is denoted, refer to the Additional RFP Requirements below to determine level of performance.

e. If the MPI Decision Tree does not identify all paint system applicable to the facility, utilize the *MPI Architectural Painting, Exterior Systems Manual* to identify other appropriate paint systems for the project. Utilize the "Premium Grade" systems and comply with all limitations stated in the MPI "Approved Product List" for each paint product. Products having an MPI VOC Range E3 must be given preferential consideration over lower VOC Ranges. Use higher performing paint systems unless the lower performing paint system can be justified based on a lifecycle cost to include surface preparation, application, disposal, environmental impact, and required recoating cycles. Only use paint products that have been tested for MPI'S "DETAILED PERFORMANCE" or "EVALUATED PERFORMANCE ". Do not use products that have only been tested for "INTENDED USE".

f. If an "Aggressive" environmental condition option is not available in the MPI Decision Tree for a certain substrate, use the "Normal" environmental condition option.

g. Refer to the Additional Exterior Paint and Coating System Requirements below for further system requirements.

Paints and coatings must comply with Master Painters Institute Green Performance Standard GPS-1-12 which is available at the following website; http://www.specifygreen.com/EvrPerf/EnvironmentalPerformance.html . Provide Interior flat intermediate and topcoats of a maximum of 50 g/L VOC and interior non-flat intermediate and topcoats of a maximum 150 g/L VOC. Choose paints that provide performance and are environmentally friendly by using total VOC budgeting to analyze the total impact of all flat, non-flat and special purpose coatings on the project.

C304001 1.1 MPI GLOSS LEVELS

Gloss levels must comply with the MPI system of determining gloss as defined in the Evaluation sections of the MPI Manuals. Utilize the performance characteristics of the paint gloss and sheen to categorize paint rather than manufactures' description of his product. The MPI Gloss Levels are indicated by the notation G1, G2, G3, G4, G5, G6, or G7. G1 is not used by Navy.

The MPI Decision Tree indicates a default gloss level for each paint system, however consider the appearance, anticipated conditions, and need for cleaning when choosing the correct gloss level for each coated surface of the project. Comply with the following guidance in choosing the appropriate gloss level.

a. Use G2 "Velvet-like" Flat for ceilings, residential walls away from human contact and low traffic areas.

b. Use G3 "Eggshell-like" in high traffic areas for ceilings and walls, when human contact with the wall is expected but limited, and for dark accent colors.

c. Use G5 Semigloss for walls, doors and trim for high durability and clean ability and when a surface is expected to have routine human contact.

d. Use G6 Gloss only in special situations such as piping identification or special effects.

The MPI Gloss and Sheen Standard values are measured per ASTM D523, and are as follows:

Gloss Level Number	Gloss@ 60 Degrees	Sheen@85 Degrees
Gloss Level 1(G1) – Matte or Flat	Max.5 units	Max.10 units
Gloss Level 2(G2) – "Velvet-like" Flat	Max. 10 units	10-35 units
Gloss Level 3(G3) – "Eggshell-like"	Max. 10-25 units	10-35 units
Gloss Level 4(G4) - "Satin-like"	Max. 20-35 units	Min. 35 units
Gloss Level 5(G5) - Semi-Gloss	35-70 units	
Gloss Level 6(G6) – Gloss	70-85 units	
Gloss Level 7(G7) – High Gloss	More than 85 units	

C304001 1.2 MPI SYSTEM DESIGNATIONS AND ABBREVIATIONS

The MPI coating system number in each Division is found in either the *MPI Architectural Painting Specification Manual*or the *Maintenance Repainting Manual*and defined as an interior system (INT/RIN).

a. INT designates an interior coating system for new surfaces.
b. RIN designates an interior coating system used in repainting projects or over existing coating systems.
c. DSD – the MPI short-term designation for Degree of Surface Degradation as defined in the Assessment sections in the *MPI Maintenance Repainting Manual*. Degree of Surface Degradation designates the MPI Standard for description and appearance of existing condition of surfaces to be painted. This DSD classification is used to determine the proper surface preparation necessary for painting.

C304001 1.3 SURFACE PREPARATION

Comply with the "Interior Surface Preparation" section of the *MPI Architectural Painting Specification Manual*or the "Interior Surface Preparation" section of the *MPI Maintenance Repainting Manual*. All suggestive language such as "may" or "should" are deleted from the standard and "must" inserted in its place. Suggestive language such as "recommended" or "advisable" is deleted from the standard and "require" or 'required" inserted in its place. The results of these wording substitutions change this document to required procedures. For surface preparation, determine a MPI DSD Assessment of each surface and comply with the MPI Surface Preparation Requirements relating to the assessments. Notwithstanding MPI requirements, clean interior ferrous metal to a SSPC SP 10 level (near white) that have aggressive chemical environments (SSPC Zones 3A, 3B, 3C, 3D, and 3E) or waterfront exposure to open structures (SSPC Zones 2A or 2B). Examples of these types of facilities are indoor water training facilities, indoor swimming pools, and open or mostly open waterfront maintenance buildings/ waterfront warehouses/ canopies.

Remove dirt, splinters, loose particles, grease, oil, and other foreign matter and substances deleterious to coating performance as specified for each substrate before application of paint or surface treatments. For existing buildings, use MPI *Maintenance Repainting Manual* to determine the coatings that need to be removed. Remove deteriorated or loose coatings before repainting begins. Oil and grease must be removed prior to mechanical cleaning. Cleaning must be programmed so that dust and other contaminants will not fall on wet, newly painted surfaces. Exposed ferrous metals such as nail heads on or in contact with surfaces to be painted with water-thinned paints, must be spot-primed with a suitable corrosion-inhibitive primer capable of preventing flash rusting and compatible with the coating specified for the adjacent areas.

C304001 1.4 ADDITIONAL INTERIOR PAINT AND COATING SYSTEMS

In addition to the MPI Decision Tree, comply with the following paint system requirements:

C304001 1.4.1 PAVEMENT COATINGS

(1) INT 3.2 Concrete Horizontal Surfaces

Normal Environmental Conditions; Pigmented

Provide road and parking lot pavement marking in accordance with UFGS Section 32 17 23, *Pavement Markings*.

SECTION D10

CONVEYING
09/22

D10 GENERAL

RFP Part 3 including the Engineering System Requirements (ESR) provide project specific requirements. The RFP Part 4, Performance Technical Sections (PTS) provide generalized technical requirements that apply to multiple facility types and include more requirements than are applicable to any one project. Therefore, only the RFP Part 4 requirements that apply to the project and further define the RFP Part 3 project specific requirements are required.

Comply with the requirements of UFC 1-200-01, *DoD Building Code*.

D10 1.1 DESIGN GUIDANCE

Provide the design and installation in accordance with the following references. This Performance Technical Specification (PTS) adds clarification to the fundamental requirements contained in the following Government Standards. The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification*.

Industry standards, codes, and Government standards referenced in the section text that are **not** found in the Unified Master Reference List (UMRL) in the Construction Criteria Base (CCB) at the Whole Building Design Guide Website , are listed below for basic designation identification. Refer to the UMRL for full reference standard title and current document date. Comply with the required and advisory portions of the current edition of the referenced standard at the time of contract award.

D10 1.1.1 Industry Standards and Codes

Although some the following references are listed in the UMRL, they are repeated here for emphasis.

References publications in this RFP that refer to the "authority having jurisdiction" shall be interpreted to mean the "Contracting Officer."

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)

ASCE 7	Minimum Design Load for Buildings and Other Structures

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

Safety Code for Elevators and Escalators

ASME A17.2	Guide for Inspection of Elevators, Escalators and Moving Walks

ASME A18.1	Safety Standard for Platform Lifts and Stairway Chairlifts
ASME B20.1	Safety Standards for Conveyors and Related Equipment

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1	Structural Welding Code Steel (NOT in Spec TEXT)

NATIONAL FIRE PROTECTION ASSOCIATION

NFPA 70	National Electric Code

D10 1.1.2 Government Standards

NAVAL FACILITIES ENGINEERING COMMAND (NAVFAC)

NAVFAC P-307	Management of Weight Handling Equipment

NAVAL SEA SYSTEMS COMMAND (NAVSEA)

T9074-AS-GIB-010/271	Requirements for Nondestructive Testing Methods.

US NATIONAL ARCHIVES AND RECORDS - OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (NARA/ OSHA) - Code of Federal Regulations (CFR)

29 CFR, Part 1910.23	Guarding Floor and Wall Openings and Holes
29 CFR, Part 1910.27	Fixed Ladders
29 CFR, Part 1910.179	Overhead and Gantry Cranes
29 CFR, Part 1910.306	Specific Purpose Equipment and Installations

U.S. DEPARTMENT OF DEFENSE (DOD) UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(UFC 1-200-01 is a hub document that provides general building requirements and references other critical UFCs. A reference to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs listed in the document.)
UFC 1-200-02	High Performance and Sustainable Building Requirements

D10 1.2 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Provide verification of satisfactory Conveying systems performance via Performance Verification Testing, as detailed in this section of the RFP.

D10 1.2.1 Testing and Inspections for Elevators

a. Conduct all testing and inspections in the presence of both the Elevator Specialist and a NAVFAC Certified Elevator Inspector. The Elevator Inspector must complete, sign and post the results of all tests and inspection results after successful completion of inspection and testing. The Contractor is responsible for all costs involved with reinspection and retesting required to correct discrepancies discovered during testing and the subsequent retesting required, including all costs and expenses incurred by the Government Furnished Inspector.

b. Testing Materials and Instruments
Provide testing materials and instruments required for final inspection, including a current equipment calibration certification.

c. Field Tests for Elevators

In addition to the tests required by AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME) A17.1 AND ASME A17.2, perform the following:

(1) Endurance Tests - Test each elevator for a period of one hour continuous run, with specified rated load in the car. Restart the one hour test period from beginning, following any shutdown or failure. During the test run, stop car at each floor in both directions of travel for standing period of 10 seconds per floor. Meet the requirements for Rated Speed, Leveling, Temperature Rise, and Motor Amperes testing specified herein throughout the duration of the Endurance test.

(2) Speed Tests - Determine actual speed of each elevator in both directions of travel with rated load and with no load in elevator car. Minimum acceptable elevator speed is the Rated speed specified. Maximum acceptable elevator speed is 110 percent of Rated speed.

(3) Leveling Tests - Test elevator car leveling devices for landing accuracy of plus or minus 1/4-inch (6 mm) at each floor

with no load in car, symmetrical load in car, and with rated load in car in both directions of travel. Car sill must be level with landing sills.

(4) Temperature Rise Tests - Determine temperature rise of elevator hoisting motor, motor-generator, exciter, and booster during full-load test run for one hour minimum. Under these conditions, maximum acceptable temperature rise must not exceed acceptable temperature rise indicated on manufacturer's data plate. Start test only when equipment is within 9 degrees F (5 degrees C) of ambient temperature.

(5) Motor Ampere Tests - Measure and record motor amperage when motor is running and elevator is lifting at rated load and speed. Measure and record motor amperage at beginning and end of Endurance test. Test results must not exceed nameplate amperage when motor is running and elevator is lifting at rated load speed.

(6) Balance Load for Electric Elevators Tests - Perform electrical and mechanical balance load tests of car and counterweight.

(7) Automatic Shutoff Valve Tests - For hydraulic elevators, test the automatic shutoff valve twice. Once at beginning of acceptance test and again at conclusion of one-hour Endurance test to ensure consistent performance of shutoff valve, regardless of temperature of equipment and oil.

(8) Perform miscellaneous tests called for in this Section.

D10 1.3 DESIGN SUBMITTALS

Provide Design Submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*, UFGS section 01 33 10.05 20, *Design Submittal Procedures*, Facilities Criteria (FC) 1-300-09N, *Navy and Marine Corps Design Procedures*, UFC 3-101-01, *Architecture* and UFC 3-301-01, *Structural Engineering*. Provide design submittals that include the following items:

a. Elevators:

(1) Drawings. Show the design of the track beam system, including switches, principal dimensions, details of structural connections, all component details, and electrical one-line diagrams. Show clearances between elevator and building and identify interferences.

(2) Specification. Provide edited version(s) of the UFGS elevator and weight handling equipment specification(s) that are applicable to this project. Edit the UFGS's in accordance with restrictions of RFP Part 4 - PTS Section Z10 and refer to Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*for format and further specification requirements. Edit UFGS to add project specific information. Submit the applicable UFGS as a part of the Contractor originated design submittal, DO NOT submit RFP Part 4 - D10 as part of the design submittal.

If this RFP includes a type of elevator and weight handling equipment that is not covered in this D10 PTS Section and is specified in a Prescriptive Specification located RFP Part 5, include this Prescriptive Specification in the Contractor's design submittal without modification.

(3) Catalog Cuts. Include catalog cuts in addition to the UFGS sections for all major components. Mark and highlight all catalog cuts to identify all the specific components that are applicable to the project.

D10 1.4 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with PTS section Z10, *General Performance Technical Specifications*. In addition to the Z10 requirements, the Designer of Record (DOR) will approve the following construction submittals as a minimum:

a. Construction Submittals for Vertical Transportation Equipment (VTE)

(1) Elevator Construction Submittals

In addition to the submittal requirements of ASME A17.1, provide the following submittals:

Detail drawings must include dimensioned layouts in plan and elevation showing the arrangement of elevator equipment, accessories, supporting systems, anchorage of equipment and anchorage forces from seismic, gravity, impact, etc. loads, clearances for maintenance and operation; and details on hoistway, doors and frames, operation and signal stations, controllers, motors, guide rails and brackets, and points of interface with normal power, fire alarm system, HVAC or exhaust systems, and interface with emergency power systems. Drawings must show any revised building electrical system required to make supplied elevator system function as specified. Drawings must contain complete wiring diagrams showing electrical connections and other details required to demonstrate sequence of operations and functions of system devices. Drawings must include the appropriate sizing of electrical protective devices, which are frequently different from National Electrical Code standard sizes.

Submit one set of wiring diagrams in plastic or glass cover, framed and mounted in elevator machine room. Deliver other sets to Contracting Officer. Coded diagrams are not acceptable unless adequately identified.

(2) Construction Submittals for Facility Electronic Operation and Maintenance Support Information (eOMSI):

Submit final submittals for eOMSI Submittal. After approval by the DOR and sign-offs by the elevator inspector, assimilate construction submittals into the OMSI manuals required under Part 2 Section 01 78 24.00 20, *Facility Electronic Operation and Maintenance Support Information*.

D1010 ELEVATORS AND LIFTS

Comply with the *UFC 3-490-06 Elevators* for the design and construction of elevators.

D1010 1.1 QUALIFICATION OF MANUFACTURER AND INSTALLER

Provide elevator by manufacturer regularly engaged in the manufacture of elevator systems. Manufacturer must either install elevator system or provide letter of endorsement certifying that installer is acceptable to manufacturer. Installer is required to be regularly engaged in installation and maintenance of elevator systems.

If the project is located in the State of Hawaii, perform work involving the installation or repair of elevator equipment under the supervision of a person who is licensed in elevator repair in the State of Hawaii or who possesses the equivalent experience. Furnish data to the Contracting Officer for verification that the person exercising direct supervision of the work possesses such experience.

D101001 GENERAL CONSTRUCTION ITEMS

Comply with ASME A17.1 AND ASME A17.2 in their entirety, and additional requirements specified herein. Install in accordance with manufacturer's instructions, ASME A17.1, DoD Architectural Barriers Act (ABA) and Deputy Secretary of Defense (DEPSECDEF) Memorandum (dated October 31, 2011), and NFPA 70. Do not cut or alter Structural Members. Restore damaged or defaced work to original condition. Include recesses, cutouts, slots, holes, patching, grouting, and refinishing to accommodate installation. Use core drilling to drill new holes in concrete ensuring that no existing reinforcing is cut. Finish work to be straight, level, and plumb. During installation, protect machinery and equipment from dirt, water, or mechanical damage. At completion, clean all work, and repair any prefinished items that have been damaged during the performance of the work.

Elevators that are intended to carry personnel other than one (1) operator must be classified as a passenger elevator. Passenger elevators that are intended to carry furniture or equipment, must have an oversized cab. Refer to the Project Program for the type of elevator required.

D101001 1.1 TRAFFIC ANALYSIS

Provide a traffic analysis in accordance with criteria established by a nationally recognized elevator manufacturer's association and conduct interviews with the User to determine the following:

a. Passenger
b. Rated load
c. Rated speed
d. Travel length
e. Number of stops
f. Number of hoistway openings
g. Car platform, car inside, and hoistway door opening dimensions
h. Hoistway Door Types
i. Car Door type

D101001 1.2 ELEVATOR MACHINE ROOM

Provide a machine room for every elevator. Locate the elevator machine and controller in the Elevator Machine Room.

D101002 PASSENGER ELEVATORS

D101002 1.1 HOISTWAY AND CAR EQUIPMENT

D101002 1.1.1 Car and Counterweight Guide Rails and Fastenings

Paint rail shanks with one coat of black enamel. Only T-section type guide rail is acceptable.

D101002 1.1.2 Pit Channel

Provide pit channel for anchorage of main guide rail brackets and also for anchorage of counterweight guide rail brackets and buffer for electric elevators. Each channel must span distance between guides. Fully grout both pit channels on completion of guide rail and buffer installation.

D101002 1.1.3 Pit "STOP" Switch

Provide push/pull type pit "STOP".

D101002 1.1.4 Wiring and Traveling Cables

Suspend cables by means of self-tightening webbed devices.

D101002 1.2 CAR AND LANDING DOOR EQUIPMENT

D101002 1.2.1 Infrared Curtain Unit

Provide Infrared Curtain Unit (ICU) with multiple infrared beams that protect to the full height of the door opening. Extend minimum coverage from 2 inches (50 mm) off the floor to 70 inches (1778 mm) above floor level.

D101002 1.2.2 Hoistway Entrance Frames

Provide 14 gage (1.8 mm) thick #4 brushed stainless steel door frame unless directed otherwise by Contracting Officer. Solidly grout uprights of entrance ways to height of 5 feet (1500 mm).

D101002 1.2.3 Car and Hoistway Landing Sills

Car and Hoistway Landing Sill - Provide one piece cast solid white bronze or nickel silver entrance sill. Use same material for hoistway and car entrance sills. Solidly grout under full length of sill.

D101002 1.3 IN-CAR AND LANDING FIXTURES

D101002 1.3.1 Car and Hall Buttons

Provide recessed vandal-resistant push buttons of minimum 3/4-inch (19 mm) size satin-finish stainless steel with illuminating jewel center.

D101002 1.3.2 Position and Direction Indicators

Provide position and direction indicators in car and at each landing.

D101002 1.3.3 Direction Audible Signals

Provide audible signals in car and at each landing.

D101002 1.4 CAR AND CAB EQUIPMENT

D101002 1.4.1 Roller Guides

Provide coil-spring loaded roller guide assemblies in adjustable mountings on each side of car and counterweight frames in accurate alignment at top and bottom of frames.

D101002 1.4.2 Certificate Window

Provide 4 inch (100 mm) high by 6 inch (150 mm) wide certificate window in car operating panel for elevator inspection certificate.

D101002 1.4.3 Cab Ventilation

Provide natural and forced ventilation with two-speed fan.

D101002 1.4.4 Protection Pads and Mounting Hooks

Provide stainless-steel hooks and fire retardant protective pads for one elevator in a set.

D101002 1.4.5 Car Enclosure

Car Shell Return Panels, Entrance Columns, Cove Base, and Transom: Provide 14 gage (1.9 mm) minimum non perforated steel. Apply sound-deadening mastic on all exterior components.

Provide finishes for the elevator cab interior that are appropriate for the type of facility. Finishes must not exceed the flame spread rates mandated by ASME A17.1.

D101002 1.4.6 Car Size

Provide at least one elevator of a size and arrangement to accommodate an ambulance stretcher in the open, horizontal position. The minimum size of the ambulance stretcher used to design the elevator must be 24 inch by 84 inch (609.6 mm by 2133.6 mm) with not less than 5 inch (127 mm) radius corners. Identify all stretcher accessible elevators with the international symbol for emergency medical services (Star of Life).

D101002 1.5 ELEVATOR CONTROLLER

D101002 1.5.1 Non-proprietary Controller

Provide micro-processor controllers from controller manufacturers who provide generic controllers that are designed to function with all or most manufacturers elevator equipment. The manufacturer of the controller must engage solely in the manufacture and sale of controllers to the elevator industry and not engage in the elevator installation, service, or maintenance. The follow controller

manufactures comply with this requirement:

a. Elevator Controls Corporation, 3525 La Grande Boulevard, Sacramento, CA 95823

b. G.A.L. Manufacturing Corporation, 50 East 153th Street, Bronx, New York 10451

c. Motion Control Engineering, Inc., 11354 Whiterock Road, Rancho Cordova, CA 95742-6522

d. Virginia Controls, Inc., 2513 Mechanicsville Turnpike, Richmond, VA 23223

e. Computerized Elevator Control Corporation (Swift), 24 Empire Blvd., Moonachie, NJ 07074-1303

The following are required features of the generic micro-processor controllers and manufacturers training:

a. On-Board Diagnostic Panel

(1) Provide a non-proprietary micro-processor controller for each individual elevator and group controller. Provide an on-board diagnostic control and LCD display panel that allows unrestricted access to the comprehensive range of adjustable parameters necessary to perform installation, adjusting, service, maintenance, and testing of the elevator.

(2) Provide LCD displays with the capability to display, monitor, and diagnose any and all fault logs, fault history, trouble calls, and diagnostics. Provide three (3) copies of the complete manufacturer's software program, with complete software documentation, that must enable the same level of unrestricted access to all controllers of the same make and model, regardless of the installation date or location.

b. External Port - For each individual elevator and group controller, provide a USB port or an RS 232 port that allows connection to an on-site portable laptop computer. Provide the same level of unrestricted access as the on-board diagnostic panel.

c. Repair Requirements - For repair of the microprocessor control system(s), provide maintenance tools, supporting computer software, and software documentation required for complete maintenance of elevator system including diagnostics and adjustments. On-board diagnostic panels must not require recharging to maintain their memory or authorization for use. Software must not require periodic reprogramming, or reauthorization. Store programs in non-volatile memory.

d. Training - The elevator controller manufacturer must offer and conduct technical support and factory training that is available to all state licensed elevator service providers qualified to bid on navy elevator maintenance service contracts. Include in the factory training all aspects of the installation, service, and maintenance

of the elevator controller.

D101002 1.6 OPERATIONAL CONTROLS

D101002 1.6.1 Independent Service

Provide exposed key-operated switch in car operating panel to enable independent service.

D101002 1.6.2 Hoistway Access Switches

Provide key-operated hoistway access switch to permit limited movement of car at terminal floors for car positioning, operative only when "INSPECTION" switch in car operating panel is in the "INSPECTION" position. Locate switch 6 feet (1800 mm) above floor level, within 12 inches (300 mm) of hoistway entrance frame or with only ferrule exposed when located in entrance frame.

D101002 1.6.3 Keys for Elevator Key Switches

Provide minimum of twelve keys per unique cylinder used on all key switches for single elevator.

D101002 1.7 MAINTENANCE AND DIAGNOSTIC COMPONENTS

D101002 1.7.1 Maintenance and Diagnostic Tools

Provide all special tools and software necessary to service and maintain each elevator; deliver at time of final acceptance. Provide one of each tool for each elevator machine room.

D101002 1.8 ADDITIONAL REQUIREMENTS FOR HYDRAULIC ELEVATORS

D101002 1.8.1 Hydraulic System

Provide hydraulic system which operates at a maximum working pressure of less than 500 psig.

a. Scavenger Pump Unit - Provide a scavenge oil reservoir, with strainer and transfer pump. Provide a manual-reset pit flood switch to prevent pump operation if pit is flooded. Anchor pump and oil reservoir to the pit floor.
b. Pressure Piping and Accessories - Provide ASTM A 53/A 53M or ASTM A 106/A 106M, Schedule 80, black steel piping with ASME B16.9 or ASME B16.11 fittings for supply piping. Provide welded or threaded forged pipe fittings that are located between the pump control valve body and the cylinder inlet. Extend Schedule 80 piping from the pump control valve body, inside the pump unit, to the hydraulic cylinder in the hoistway. Provide dielectric union at each end of the "pump to cylinder" oil supply line. Provide hangers or supports for all piping.
c. Oil Temperature Device - Provide means to maintain oil temperature between 80 and 120 degrees F (27 and 49 degrees C) regardless of ambient temperature.

D101002 1.8.2 Cylinder-Plunger Unit

Provide a plunger of single-piece seamless steel construction. Provide threaded 1/4-inch (6 mm) bleeder valve at top of cylinder just below packing gland. Telescopic or inverted cylinder-plunger units are not acceptable. Provide cylinder with self-stabilizing mount that will support and hold cylinder plumb without the need for stabilization means at the bottom of the cylinder.

D101002 1.8.3 Automatic Shutoff Valve

Provide automatic shut-off valve in oil supply line as close to cylinder inlet as possible. Provide threaded pipe connections to the valve. Provide manual lowering feature on valve. Provide exposed adjustments of automatic shut-off valve with means of adjustment sealed by certified elevator inspector after being set to correct position and tested.

D101002 1.8.4 Well Casing

Line well with steel casing, minimum 1/4-inch (6 mm) wall with welded 1/2-inch (10 mm) steel bottom, set plumb. Install cylinder well casing plumb using spider bob method.

a. PVC Liner - Provide Schedule 80 PVC pipe liner with bottom cap and couplings; joints sealed watertight using PVC pipe manufacturer's recommended adhesive or heat welding methods. Provide liner inside diameter not less than 3-inch (76 mm) larger than elevator cylinder maximum outside diameter. Set PVC liner into well casing, centered and plumb. PVC liner may be provided as a manufacture’s applied liner or as a separate component.
b. Cylinder Installation - Install Cylinder plumb into PVC.
c. Cylinder Evacuation Tube - Provide a 3/4-inch (19 mm) PVC evacuation tube with strainer located within 6 inch (152 mm) of bottom of liner. Provide top of test tube with removable cap to exclude foreign matter.
d. Pressure Test - Test liner-cylinder assembly as a sealed unit. Provide safety relief valve set to relieve at 10 psig (69 kPag); 4.5 inch (114 mm) diameter dial pressure gage scaled for 0 to 50 psig (0 to 175 kPag) and calibrated to 0.5 percent accuracy; and an air pressure admission throttling and shutoff valve. Perform air pressure test in the presence of the Elevator Inspector. For safety, pressure test must only be performed when liner and cylinder are fully inserted and assembled in the well casing. Perform the test from remote location outside of the elevator pit.
e. Secure cylinder/PVC liner assembly as recommended by cylinder manufacturer.
f. Seal - Seal gap between steel well casing and PVC liner with foam insert strong enough to retain and support final grouting. Provide 3000 psi (21 MPa) grout to a minimum of 4 inch (102 mm) thickness and level top of final grouting with pit floor.
g. Containment - Protect exposed portions of hydraulic elevator oil supply line that are installed below ground, including portions encapsulated in concrete, or covered by construction, with continuous Schedule 80 PVC containment.

h. Provide layout diagram, foundation support details, and foundation loads.

D109002 CONVEYORS

Comply with ASME B20.1, *Safety Standards for Conveyors and Related Equipment*.

-- End of Section --

SECTION D20

PLUMBING
12/18

D20 GENERAL

RFP Part 3 including the Engineering System Requirements (ESR) provide project specific requirements. The RFP Part 4, Performance Technical Sections (PTS) provide generalized technical requirements that apply to multiple facility types and include more requirements than are applicable to any one project. Therefore, only the RFP Part 4 requirements that apply to the project and further define the RFP Part 3 project specific requirements are required.

D20 1.1 NARRATIVE

Use this section in conjunction with all parts of the Design Build (D/B) Request for Proposal (RFP) to determine the full requirements of this solicitation.

This section includes the construction of interior plumbing systems. This section covers installations inside the facility and out to the five foot line. See Section G30, *Site Civil/Mechanical Utilities*, for continuation of systems beyond the five foot line.

D20 1.2 PLUMBING DESIGN GUIDANCE

Provide the design and installation in accordance with the following references. This Performance Technical Specification (PTS) adds clarification to the fundamental requirements contained in the following Government Standards. The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification*.

D20 1.2.1 Government Standards

Federal Energy Management Program (FEMP)

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s):UFC 3-401-01, Mechanical EngineeringUFC 3-420-01, Plumbing Systems)
UFC 1-200-02	High Performance and Sustainable Building Requirements

D20 1.3 DESIGN SUBMITTALS

Submit design submittals in accordance with Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, FC 1-300-09N, *Navy and Marine Corps Design Procedures*, and UFC 3-401-01, *Mechanical Engineering*.

D20 1.4 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with PTS section Z10, *General Performance Technical Specifications*. In addition to the Z10 requirements, the Designer of Record (DOR) must approve the following construction submittals as a minimum:

Fixtures, equipment, and OMSI information for all equipment and fixtures.

D20 1.5 QUALITY CONTROL

Upon completion of the installation test all systems in accordance with the IPC.

D2010 PLUMBING FIXTURES

Provide EPA's "WaterSense" labeled fixtures where available.

D201001 WATER CLOSETS

D201001 1.1 FLUSH VALVE WATER CLOSETS

ASME A112.19.2, white vitreous china, siphon jet. Provide ASME A112.19.5 trim. Provide self-closing metering type flush valve, unless automatic flush control is specified in the ESR Section D20. Automatic flush control must conform to UL 1951 and ASSE 1037. Automatic flushing systems to consist of solenoid-activated valves with light beam sensors and include an override pushbutton. Flush valve not to exceed 1.28 GPF (4.8 LPF). Mount handicapped fixtures at a height and provide appurtenances in accordance with ABA Standards.

D201001 1.2 DUAL FUNCTION FLUSH VALVE WATER CLOSETS

ASME A112.19.2, white vitreous china, siphon jet. Provide ASME A112.19.5 trim. Provide self-closing metering type dual function flush valve, unless automatic flush control is specified in the ESR Section D20. Automatic flush control must conform with UL 1951 and ASSE 1037. Automatic flushing systems to consist of solenoid-activated valves with light beam sensors and include an override pushbutton. Dual function flush valve must provide a flush of 0.8 to 1.1 GPF (3.0 to 4.2 LPF) or 1.28 GPF (4.8 LPF). Maximum flush volume not to exceed 1.28 GPF (4.8 LPF). Mount handicapped fixtures at a height and provide appurtenances in accordance with ABA Standards.

D201001 1.3 FLUSH TANK WATER CLOSETS

ASME A112.19.2, white vitreous china, siphon jet. EPA "WaterSense" labeled. Provide ASME A112.19.5 trim. Water flushing volume of the water closet not to exceed 1.28 GPF (4.8 LPF). Mount handicapped fixtures at a height and provide appurtenances in accordance with ABA Standards.

D201001 1.4 DUAL FUNCTION FLUSH TANK WATER CLOSETS

ASME A112.19.2, white vitreous china, siphon jet. Provide ASME A112.19.5 trim. Dual function flush tank water closet providing a dual flush of 0.8 to 1.1 GPF (3.0 to 1.6 LPF) or 1.28 GPF (4.8 LPF). Maximum flush tank volume not to exceed 1.28 GPF (4.8 LPF). Mount handicapped fixtures at a height and provide appurtenances in accordance with ABA Standards.

D201002 URINALS

D201002 1.1 FLUSH VALVE URINALS

ASME A112.19.2, white vitreous china, wall-mounted, wall outlet, siphon jet, integral trap, extended side shields. EPA "WaterSense" labeled. Provide large diaphragm (not less than 2.625 inches (66 mm) upper chamber inside diameter at the point where the diaphragm is sealed between the upper and lower chambers) flush valve of chrome plated cast brass conforming to ASTM B 584, including vacuum breaker and angle (control-stop) valve. Maximum flush valve volume not to exceed 0.5 gallons per flush (1.9 lpf). Provide ASME A112.19.5 trim and ASME 112.6.1M concealed chair carriers. Provide self-closing metering type flush valve, unless automatic flush control is specified in the ESR Section D20. Automatic flush control in conformance with UL 1951 and ASSE 1037. Automatic flushing systems to consist of solenoid-activated valves with light beam sensors and include an override pushbutton. Select and install urinals and appurtenances in accordance with the ABA Standards.

D201002 1.2 WATERLESS URINALS

ASME A112.19.2, white vitreous china, wall-mounted, wall outlet, non-water using, integral drain line connection, with sealed replaceable cartridge or integral liquid seal trap insert. The urinal and trap assembly must maintain a sufficient barrier of a biodegradable immiscible liquid to provide the trap seal and inhibit the backflow of sewer gases. For urinals that use a replaceable cartridge, provide four additional cartridges for each urinal installed. Provide an additional quart of biodegradable liquid for each urinal installed. Provide ASME A112.6.1M concealed chair carriers. Install and test in accordance with the manufacturers' recommendations. Drain lines that connect to the urinal outlet must not be made of copper tube or pipe. Select and install urinal and appurtenances in accordance with ABA Standards. Slope the sanitary sewer branch line for waterless urinals a minimum of 1/4-inch per foot. Provide manufacturer's operating manual and on-site training for the proper care and maintenance of the urinal.

D201003 LAVATORIES

D201003 1.1 COUNTERTOP LAVATORIES

Unless integral bowl is specified elsewhere, lavatories to be white, ASME A112.19.2 vitreous china lavatories with minimum dimensions of 19 inches (483 mm) wide x 18 inches (457 mm) front to rear, and self-rimming type. Provide ASME 112.18.1 copper alloy centerset faucets unless self closing metering or automatic control is specified in ESR section D20.
Automatic faucet systems to consist of solenoid-activated valves with light beam sensors and include an override pushbutton. Provide EPA "WaterSense"

labeled faucets. Provide with aerator, adjustable P-traps, and perforated grid strainers, unless pop-up drain fittings are specified in ESR section D20.

D201003 1.2 WALL-MOUNTED LAVATORIES

ASME A112.19.1, white enameled cast-iron or ASME A112.19.2 white vitreous china with ASME A112.6.1M concealed arm carrier support, with minimum dimensions of 19 inches wide by 18 inches (483 mm wide by 457 mm) front to rear. Provide ASME 112.18.1 copper alloy centerset faucets unless self closing metering or automatic control is specified in ESR section D20. Automatic faucet systems to consist of solenoid-activated valves with light beam sensors and include an override pushbutton. Provide EPA "WaterSense" labeled faucets. Provide with aerator, adjustable P-traps, and perforated grid strainers, unless pop-up drain fittings are specified in ESR section D20.

D201003 1.3 HANDICAPPED LAVATORIES

Same as Paragraphs 1.1 or 1.2, except height and appurtenances to be in accordance with ABA Standards.

D201004 SINKS

D201004 1.1 COUNTERTOP SINKS

ASME A112.19.3 sink, 20 gage stainless steel with integral mounting rim, minimum dimensions of 33 inches (840 mm) wide for two compartment or 21 inches (560 mm) wide for one compartment by 21 inches (560 mm) front to rear, with ledge back and undersides coated with sound dampening material. Provide top-mounted ASME A112.18.1 copper alloy faucets, swing spout with aerator, and stainless steel drain outlets with cup strainers. Provide adjustable P-trap with drain piping to vertical vent stack. If specified in ESR section D20, provide UL 430 waste disposer unit in right compartment.

D201004 1.2 SERVICE SINKS

ASME A112.19.1, white enameled cast-iron or ASME A112.19.2 white vitreous china, wall mounted and floor supported by wall outlet cast-iron P-trap, minimum dimensions of 22 inches (560 mm) wide by 20 inches (508 mm) front to rear with 10 inch (254 mm) splashback, and stainless steel rim guard. Provide ASME A112.18.1 copper alloy back-mounted combination faucets with vacuum breaker and 0.75 inch (20 mm) external hose threads.

D201004 1.3 MOP SINKS

Pre-cast terrazzo floor-mounted mop sink, 36 inches x 36 inches x 12 inches (914 mm x 914 mm x 305 mm), made of marble chips cast in white Portland cement to a compressive strength of not less than 3000 PSI (20.7 mPa) 7 days after casting. Provide brass body drains with nickel bronze strainers cast integral with terrazzo. Provide stainless steel rim guard for mop sink. Provide chrome-plated exposed hot and cold water faucets ASME A112.18.1 wall-mounted copper alloy faucets swing spout with 3/4 inch (20 mm) hose connection, vacuum breaker, and pail hook. Provide mop hanger on wall above sink suitable for four mops.

D201004 1.4 LAUNDRY SINKS

IAPMO Z124.6, plastic, two compartment, minimum dimensions of 40 inches wide by 21 inches (1016 mm wide by 533 mm) front to rear, with floor-supported steel mounting frame secured to wall. Provide ASME A112.18.1 copper alloy centerset faucets, swing spout with aerator, and stainless steel drain outlets with cup strainers, and 1.5 inch (40 mm) adjustable P-trap with drain piping to vertical vent stack.

D201005 SHOWERS/TUBS

D201005 1.1 ONE PIECE BATH AND SHOWER MODULES

IAPMO Z124, made of white fiberglass reinforced plastic (FRP) or acrylic with slip-resistant bathing surfaces, integral grab bar, and three walls integrally molded in one piece. Provide outlet at left or right as necessary to suit module arrangement. Provide pop-up drain fittings and adjustable P-trap. Provide diverter type bathtub and shower supply fittings with body mounted from behind the wall. Provide tub fill over-rim spout with diverter.

D201005 1.2 SHOWER STALLS

IAPMO Z124, made of white solid acrylic pressure molded fiberglass reinforced plastic (FRP) shower stalls. Stalls to be scratch-resistant, waterproof and reinforced with integral grab bar, and three walls integrally molded in one piece. Provide diverter type shower supply fittings with body mounted from behind the wall.

D201005 1.3 SHOWER FLOORS

Precast terrazzo or Acrylic Shower Floors: Terrazzo must be made of marble chips cast in white Portland cement to produce a compressive strength of not less than 3000 psi (20.7 MPa) 7 days after casting. Provide brass body drains with nickel bronze strainers cast integral with terrazzo.

D201005 1.4 BATHTUBS

ASME A112.19.1 white enameled cast-iron or porcelain steel bathtubs, recessed type, minimum dimensions of 60 inches (1524 mm) wide by 30 inches (762 mm) front to rear by 16 inches (406 mm) high with drain outlet for above-the-floor drain installation. Provide diverter type bathtub and shower supply fittings with body mounted from behind the wall. Provide tub overfill rim spout with diverter.

D201005 1.5 SHOWER SUPPLY FITTINGS

ASME A112.18.1, ball joint, self-cleaning, adjustable spray pattern shower heads, connected to concealed pipe connected to copper alloy pressure balance single control type mixing valves with front access integral screwdriver stops. Provide EPA "WaterSense" labeled showerhead. Anchor the mixing valves and the pipe to each showerhead in wall to prevent movement.

D201005 1.6 HANDHELD SHOWER HEAD

ASSE 1014, adjustable spray hand-held shower head with swivel fitting, 60

inch (1524 mm) minimum flexible chrome plated copper alloy hose and in-line vacuum breaker. Provide push button flow control if specified in ESR section D20. Provide 25 inch (635 mm) grab bar with sliding spray holder that locks at any height.

D201006 DRINKING FOUNTAINS AND COOLERS

D201006 1.1 DRINKING FOUNTAINS

Wall mounted drinking fountain, constructed of white enameled cast iron with bubbler and push button control. Mount handicapped fixture at a height and provide appurtenances in accordance with ABA Standards.

D201006 1.2 ELECTRIC WATER COOLERS

AHRI 1010, wall-mounted, bubbler style, air-cooled condensing unit, 8.0 gph (.5 L per second) minimum capacity, stainless steel splash receptor, double wall heat exchanger, and all stainless steel cabinet. Provide ASME A112.6.1M concealed wall hangers with thru-bolts and back plates. Mount handicapped fixture and provide appurtenances in accordance with ABA Standards.

D201090 EMERGENCY FIXTURES

Pressure-compensated tempering valve is required for emergency fixtures, with leaving water temperature setpoint adjustable throughout the range 60 to 95 degrees F (15.5 and 35 degrees C) unless cold water supply meets temperature criteria.

Provide packaged, UL listed, alarm system; including an amber strobe lamp, horn with externally adjustable loudness and horn silencing switch, mounting hardware, and waterflow switch, assembled and prewired for waterproof service within NEMA Type 3 or 4 enclosures or for explosion proof service within NEMA Type 7 or 9 enclosures.

D201090 1.1 EMERGENCY SHOWER

ISEA Z358.1, wall-mounted self-cleaning, non-clogging 10 inch (250 mm) diameter stainless steel deluge shower head with elbow, one inch (25 mm) full-flow stay-open ball valve with pull rod and 8 inch (200 mm) diameter ring or triangular handle, one inch (25 mm) interconnecting fittings.

D201090 1.2 EMERGENCY EYE & FACE WASH

ISEA Z358.1, wall-mounted self-cleaning, non-clogging eye and face wash with quick opening, full-flow valves, stainless steel eye and face wash receptor. Provide copper alloy control valves.

D201090 1.3 COMBINATION EMERGENCY SHOWER & EYEWASH

ISEA Z358.1, column mounted on a floor flange. Design combination unit so components can be operated individually from a common fixture supply line. Provide a self-cleaning, non-clogging 10 inch (250 mm) diameter stainless steel deluge shower head with elbow, full flow stay-open ball valve with pull rod and 8 inch (200 mm) diameter ring or triangular handle one inch (25 mm) interconnecting fittings. Provide a self-cleaning, non-clogging eye and face wash with quick opening, full-flow valves, stainless steel eye

and face wash receptor. Provide copper alloy control valves.

D2020 DOMESTIC WATER DISTRIBUTION

D202001 PIPES & FITTINGS

D202001 1.1 COPPER

Use copper tubing and fittings for pipe sizes 4 inches (100 mm) or smaller. Use type L tubing above ground with solder fittings. For buried piping, use type K tubing with solder fittings.

D202001 1.2 CHLORINATED POLYVINYL CHLORIDE (CPVC)

When specified in ESR section D20, provide CPVC pipe, fittings, and solvent cement meeting requirements of ASTM D 2846/D 2846M for sizes 4 inches (100 mm) and smaller. Provide transition union connections or threaded gate valve between metallic piping and CPVC piping.

D202002 VALVES & HYDRANTS

D202002 1.1 VALVES

Provide valves at water supplies to fixtures and to provide ease of maintenance.

D202002 1.2 HOSE BIBBS & HYDRANTS

Use non-freeze wall hydrants where the winter design temperature is at or below freezing. Hose bibbs are acceptable for use elsewhere.

D202002 1.2.1 Hose bibbs

Angle type, copper alloy hose bibbs with vacuum breaker.

D202002 1.2.2 Wall Hydrants

Non-freeze, ASSE 1019, cast bronze, with vacuum breaker, locking shield and tee-handle.

D202003 DOMESTIC WATER EQUIPMENT

D202003 1.1 BACKFLOW PREVENTERS

Provide backflow prevention devices that are approved by the State or local regulatory agencies. If there are no State or local regulatory agency requirements, provide backflow prevention devices that are listed by the Foundation for Cross-Connection Control & Hydraulic Research (FCCHR), or any other approved testing laboratory having equivalent capabilities for both laboratory and field evaluation of backflow prevention devices and assemblies. Provide freeze protection for aboveground exterior applications in areas where the winter design temperature is at or below freezing.

D202003 1.2 WATER HEATERS

Provide heaters complete with control system, gauges and ASME rated combination pressure and temperature relief valve. Heaters must meet the performance requirements of ASHRAE 90.1-2013 Table 7.8. Automatic storage type heaters must meet the Energy Star product definition specified in https://www.energystar.gov/products/spec and product to be Energy Star certified. For storage type water heaters, provide ASME code stamped tanks for domestic hot water. Lining must meet NSF 61.

D202003 1.2.1 Electric Water Heaters

Electric water heaters with double heating element meeting requirements of UL 174 for water heaters with less than 120 gallons of storage and 200,000 btuh input. Provide water heater meeting requirements of UL 1453 for commercial water heaters with 120 gallons of storage or more and 200,000 btuh input or more. Provide water heaters equipped with glass-lined steel tanks, high efficiency type, insulated with polyurethane foam insulation, replaceable anodes, and adjustable range thermostat to allow hot water settings between 90 and 160 degrees F (32 and 71 degrees C). Water heater warranty must be a minimum of 5 years. In accordance with FEMP requirements, heaters with storage capacity of 55 gallons (209 liters) or less and maximum energy input of 12 kW must have a minimum energy factor (EF) of 0.93 or higher and an annual energy usage of 4,721 kWh or less tested in accordance with U.S. Department of Energy (DOE) test procedure (10 CFR 430, Subpart B, Appendix E). Heaters with storage capacity of greater than 55 gallons (209 liters) and maximum energy input of 12 kW must have a minimum energy factor (EF) of 0.92 and an annual energy usage of 4,773 kWh or less tested in accordance with U.S. Department of Energy (DOE) test procedure (10 CFR 430, Subpart B, Appendix E).

D202003 1.2.2 Gas-Fired Water Heaters

High efficiency storage type water heaters meeting requirements of CSA/AM Z21.10.1 for water heaters with less than 120 gallons of storage and input ratings of 75,000 btuh or less. Provide water heater meeting requirements of CSA/AM Z21.10.3 for commercial water heaters with 120 gallons of storage or more and input ratings above 75,000 btuh. Water heaters must meet AGA requirements. Provide water heaters equipped with glass-lined steel tanks, polyurethane foam insulation, replaceable anodes, and adjustable range thermostat to allow hot water settings between 110 and 160 degrees F (43 and 71 degrees C). Water heater warranty must be a minimum of 5 years. Provide vent in accordance with NFPA 54.

D202003 1.2.3 Electric Instantaneous Water Heaters (Tankless)

UL 499, heater(s) of the modulating, under the sink, point-of-use type. Output temperature must be adjustable from 40 degrees F to 160 degrees F. Heating elements must be field replaceable. Unit(s) must have a minimum 5-year warranty.

D202003 1.2.4 Steam Heat Exchangers

Double wall copper tube domestic water heating elements constructed with air gap to atmosphere between the two walls using steam as the heating medium exterior of the heating elements. Provide posted

operating instructions for water heaters.

D202003 1.2.5 Storage Tanks

AWWA D100, glass- or cement-lined vertical steel tanks, minimum of 125 psig (862 kPa) (gage) working pressure.

D202003 1.3 PUMPS

D202003 1.3.1 Inline Pumps

In-line circulator for service water distribution system. Factory assembled and tested pumps constructed of materials suitable for hot domestic water service.

D202003 1.3.2 Base Mounted Pumps

Potable water service, base mounted, end suction pumps with mechanical seals and drip-proof electric motors.

D202003 1.4 DOMESTIC WATER PRESSURE BOOSTER SYSTEM

Factory assembled, tested, and certified by a single manufacturer who assumes undivided responsibility for the system to include providing start-up services, two days instruction and furnishing related operations and maintenance manuals. Provide each building with its own system. Each system will consist of a minimum of two pumps mounted on a single, welded structural steel base. Provide bladder type low-flow accumulator storage tank, lead-lag pump alternator selector switches and all related controls and alarms required for safe and proper system operation. Provide constant speed or variable frequency drive pump operation.

D202003 1.5 EXPANSION TANKS

Steel expansion tank with potable water rated polypropylene or butyl lined diaphragm at water heater.

D202003 1.6 WATER METERS

See PTS G30, Site Civil/Mechanical Utilities, for water meter requirements.

D202003 1.7 MASTER THERMOSTATIC MIXING VALVES

ASSE 1017.

D202004 INSULATION & IDENTIFICATION

D202004 1.1 PIPING INSULATION

Mineral fiber insulation on domestic hot water supply and recirculation piping. Insulate domestic cold water piping with cellular glass insulation.

D202004 1.2 PIPING & EQUIPMENT IDENTIFICATION

In addition to the requirements in Section Z10, *General Performance Technical Specification*, provide engraved brass, laminated plastic, or

engraved anodized aluminum nameplates for valves. Stop valves in supplies to fixtures will not require nameplates. Identify above ground pipe with the type of service and direction of flow. Letter size, lengths and colors to be in accordance with ANSI A13.1.

D202005 SPECIALTIES

D202005 1.1 WASHING MACHINE CONNECTOR BOX

Recessed wall box fabricated of PVC plastic. Provide bronze dual washing machine valve with single lever shut-off.

D202005 1.2 VALVE BOXES

For each buried valve provide cast-iron, ductile-iron box of a suitable size. Provide cast-iron or ductile-iron cover for the box with the word "WATER" cast on the cover.

D202005 1.3 WATER HAMMER ARRESTORS

PDI WH 201, water hammer arrestors in lieu of air chambers.

D202005 1.4 ICEMAKER CONNECTOR BOX

Recessed wall box fabricated of PVC plastic. Provide bronze shut-off valve.

D202090 OTHER DOMESTIC WATER SUPPLY

D202090 1.1 SUPPORTS

Provide piping supports. If a supported floor slab is used, support all piping located below the building from the building support slab.

D202090 1.2 INSPECTIONS

Prior to initial operation, inspect piping system for compliance with drawings, specifications, and manufacturer's submittals.

D202090 1.3 DISINFECTION

Upon completion of the installation, disinfect all systems.

D202090 1.4 PLUMBING SYSTEMS TESTING

Upon completion of the installation test all systems per the IPC.

D2030 SANITARY WASTE

D203001 WASTE PIPE & FITTINGS

D203001 1.1 PIPING AND FITTINGS

Cast iron hub and spigot pipe and fittings, rubber compression gasket joints or cast-iron hubless pipe and fittings, CISPI 301 with CISPI 310 couplings. Where indicated in ESR Section D20, plastic PVC or ABS piping, fittings, and solvent cement meeting requirements of ASTM D 2665 or ASTM D 2661 may

be provided. Equip plastic piping with approved firestopping devices as required by code.

D203001 1.2 CLEANOUTS

Provide cleanouts. Utilize material consistent with the piping system materials. Do not locate sanitary cleanouts within occupied spaces, with the exception of toilet and janitor spaces.

D203002 VENT PIPE & FITTINGS

Cast-iron hubless pipe and fittings, CISPI 301 with CISPI 310 couplings. Where indicated in ESR Section D20, plastic PVC or ABS piping, fittings, and solvent cement meeting requirements of ASTM D 2665 or ASTM D 2661. Equip PVC piping with approved firestopping devices as required by code. Single drainage/vent stack systems (such as Philadelphia system) and mechanical air admittance valves are not acceptable.

D203003 FLOOR DRAINS

Flush strainer or extended rim type. Provide in mechanical rooms, restrooms, fire pump room, laundry room, and plumbing chase areas. Also provide floor drains in specific areas of subsistence buildings and cold-storage buildings as identified in UFC 3-420-01. Provide floor sinks in kitchens. Provide floor sinks where required for interior air handling unit condensate drains. Install condensate and drain piping to avoid interference with equipment access and prevent trip hazards.

D203004 SANITARY & VENT EQUIPMENT

D203004 1.1 PUMPS

D203004 1.1.1 Sump Pumps

Factory assembled and tested submersible type pumps for operation under water.

D203004 1.1.2 Sewage Pumps

FS A-A-50555, single or duplex type to meet demand. For duplex types, provide with automatic controls to alternate the operation from one pump to the other.

D2040 RAIN WATER DRAINAGE

D204001 PIPE & FITTINGS

Cast iron hubless pipe and fittings, CISPI 301 with CISPI 310 couplings. Where indicated in ESR Section D20, plastic PVC or ABS piping, fittings, and solvent cement meeting requirements of ASTM D 2665 or ASTM D 2661 may be used. Equip PVC piping with approved firestopping devices as required by code.

D204002 ROOF DRAINS

ASME A112.6.4, with dome and integral flange. Provide a device for making a watertight connection between roofing and flashing.

D204003 RAIN WATER DRAINAGE EQUIPMENT

Where required by building design, provide expansion joint(s) of proper size to receive the conductor pipe. The expansion joint must consist of a heavy cast-iron housing, brass or bronze sleeve.

D204004 INSULATION & IDENTIFICATION

Provide flexible elastomeric cellular, faced phenolic foam, or cellular glass insulation on all drainage piping that may be subject to condensation. Provide a vapor retarder. Identify aboveground pipe with the type of service and direction of flow. Letter size, lengths and colors to be in accordance with ANSI A13.1.

D2090 OTHER PLUMBING SYSTEMS

D209001 SPECIAL PIPING SYSTEMS

D209001 1.1 NATURAL GAS PIPING

Conform to requirements of the local natural gas utility and ASME B31.8, *Gas Transmission and Distribution Piping Systems*, for exterior piping. Conform to requirements of NFPA 54, *National Fuel Gas Code*, for interior gas piping. Provide meter and pressure regulator in accordance with the requirements of the local utility. Provide earthquake valve where required by code.

D209002 ACID WASTE SYSTEMS

Acid-resistant DWV pipe, fittings, and couplings with mechanical, bell and spigot, or fusion type joints. Material for buried piping and aboveground piping must be silicon-iron composition. Borosilicate glass pipe and fitting may be provided for aboveground piping where acid composition dictates, except vent piping through and above roofs must be silicon-iron composition. Provide cleanouts and drains as specified for DWV piping, except material must be silicon-iron composition.

D209003 INTERCEPTORS

D209003 1.1 OIL INTERCEPTOR

Oil interceptor, where required, with a minimum flow capacity to meet system demand.

D209003 1.2 GREASE INTERCEPTORS

Provide in accordance with PDI G 101.

D209005 COMPRESSED AIR SYSTEM (NON-BREATHING)

D209005 1.1 AIR COMPRESSOR

Factory packaged electric motor driven, duplex air compressor including manufacturer’s standard air filter, oil filter, and plug drain. Air compressor, aftercooler, and receiver must be factory packaged as a unit. Receiver tank must meet requirements of ASME PBVC Sec. VIII D1, labeled and rated for 200 PSI (1.38 MPa) gage, equipped with required valves and trimmings, including gage and automatic drain valve and ASME BPVC pressure

safety relief valve. Size air compressor and receiver in accordance with the Compressed Air and Gas Institute (CAGI) guidelines. Locate air compressor away from noise sensitive areas.

D209005 1.2 REFRIGERATED AIR DRYER

Low-pressure compressed air dryer of the mechanical refrigeration type, equipped with an automatic temperature shutdown switch to prevent freezing, a regenerative air-to-air exchanger (as standard with the manufacturer), and a main compressed air cooling exchanger. Refrigeration system must use non-CFC refrigerant and must cool compressed air to dry the air. Dryer operating pressure not less than 125 PSI (862 kPa) gage. Size the dryer based on system pressure, the entire system air flow, and providing air with a dew point 5 degrees F (-15 degrees C) lower than the most stringent equipment or outlet requirement. The pressure drop of the dryer must not exceed 2 PSI (13.8 kPa) gage.

D209005 1.3 COMPRESSED AIR PIPING SYSTEM

Piping in conformance with the requirements of ASME B31.1 for materials, assembly, and testing. Provide steel, black seamless schedule 40 carbon steel piping material meeting requirements ASTM A 53/A 53M with threaded fittings or copper tubing meeting requirements of ASTM B 88, Type K or Type L, hard drawn, Class 1, with wrought copper or bronze fittings. Provide compressed air drops in locations to facilitate work required with quick disconnects throughout the work areas to allow connection of such as pneumatic tools and air guns. Equip each air drop with a filter/moisture separator, pressure gauge, air pressure regulator, and a quick-disconnect.

-- End of Section --

SECTION D30

HVAC
09/22

D30 GENERAL

RFP Part 3 including the Engineering System Requirements (ESR) provide project specific requirements. The RFP Part 4, Performance Technical Specifications (PTS) provide generalized technical requirements that apply to multiple facility types and include more requirements than are applicable to any one project. Therefore, only the RFP Part 4 requirements that apply to the project and further define the RFP Part 3 project specific requirements are required.

D30 1.1 NARRATIVE

This section includes the construction of interior mechanical systems. This section covers installations inside the facility and out to the five foot line. See Section G30, *Site Civil/Mechanical Utilities*, for continuation of systems beyond the five-foot line.

D30 1.2 MECHANICAL DESIGN GUIDANCE

Provide the design and installation in accordance with the following references. This Performance Technical Specification (PTS) adds clarification to the fundamental requirements contained in the following Government Standards. The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification*.

D30 1.2.1 Government Standards

Federal Energy Management Program (FEMP)

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s):UFC 3-401-01, Mechanical EngineeringUFC 3-420-01, Plumbing Systems)
UFC 1-200-02	High Performance and Sustainable Building Requirements
UFC 3-440-01	Facility-Scale Renewable Energy Systems

UNIFIED FACILITIES GUIDE SPECIFICATIONS (UFGS)

UFGS 01 78 24.00 20	Facility Electronic Operation and Maintenance Support Information (eOMSI)
UFGS 23 05 93	Testing, Adjusting, and Balancing for HVAC
UFGS 23 09 00	Instrumentation and Control for HVAC
UFGS 23 09 23.02	BACnet Direct Digital Control for HVAC and Other Building Control Systems
UFGS 23 09 13	Instrumentation and Control Devices for HVAC
UFGS 23 81 23	Computer Room Air Conditioning Units

D30 1.3 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

a. Verification of satisfactory HVAC system performance must be via Performance Verification Testing, as detailed in this section.
b. The Government reserves the right to witness all Acceptance Tests and Inspections, review data, and request other such additional inspections and repeat tests as necessary to ensure that the system and provided services conform to the stated requirements.
c. The Qualified Testing Organization must provide the Acceptance Tests and Inspections test plan and perform the acceptance tests and inspections. Perform and evaluate test methods, procedures, and test values in accordance with appropriate standards, and the manufacturer's recommendations. Place equipment in service only after completion of required tests and evaluation of the test results have been completed. Supply to the testing organization complete sets of shop drawings, settings of adjustable devices, and other information necessary for an accurate test and inspection of the system prior to the performance of any final testing. Perform acceptance tests and inspections on Computer Room Air Conditioning Units, Direct Digital Control System, and HVAC Testing/Adjusting/Balancing.

D30 1.4 HVAC COMMISSIONING

Commission the HVAC systems per the Commissioning Plan as required by Part 2 Section 01 45 00.05 20, *Design & Construction Quality Control*. HVAC system commissioning must coordinate with and incorporate the testing, reporting, training & O&M documentation requirements of UFGS 23 05 93, *Testing, Adjusting, and Balancing for HVAC*; UFGS 23 09 00, *Instrumentation and Control for HVAC*; UFGS 23 09 23.02, *BACnet Direct Digital Control for HVAC and Other Building Control Systems*; and UFGS 23 09 13, *Instrumentation and Control Devices for HVAC*.

D30 1.5 DESIGN SUBMITTALS

Submit design Submittals in accordance with Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, FC 1-300-09N, *Navy and Marine Corps Design Procedures*, and UFC

3-401-01, *Mechanical Engineering*.

In addition, UFGS sections listed below or in the body of the PTS text are to be used by the Designer of Record (DOR) as a part of the design submittal. If the UFGS products or systems are applicable to the project, the DOR must edit these referenced UFGS sections and submit them as a part of the design submittal specification. Edit the specification sections in accordance with the limitations stated in PTS section Z10, *General Performance Technical Specifications*.

UFGS 01 78 24.00 20, *Facility Electronic Operation and Maintenance Support Information (eOMSI)*

UFGS 23 09 00, *Instrumentation and Control for HVAC*

UFGS 23 09 23.02, *BACnet Direct Digital Control for HVAC and Other Building Control Systems*

UFGS 23 09 13, *Instrumentation and Control Devices for HVAC*

UFGS 23 05 93, *Testing, Adjusting, and Balancing for HVAC*

UFGS 48 14 13.00 20, *Solar Liquid Flat Plate and Evacuated Tube Collectors*

D30 1.6 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with PTS section Z10, *General Performance Technical Specifications*. In addition to the Z10 requirements, the Designer of Record (DOR) must approve the following construction submittals as a minimum:

Solar hot water heating system fixtures and equipment, and OMSI information for all equipment and fixtures.

D30 1.7 MOTORS

High efficiency single-phase fractional-horsepower alternating-current motors, corresponding to the applications listed in NEMA MG 11. Select polyphase motors based on high efficiency characteristics relative to the applications as listed in NEMA MG 10. Additionally, all polyphase squirrel-cage medium induction motors with continuous ratings must meet or exceed energy efficient ratings in accordance with Table 12-10 of NEMA MG 1. Provide controllers for 3-phase motors rated 1 hp (0.75 kW) and above with phase voltage monitors designed to protect motors from phase loss and over/under-voltage. Provide means to prevent automatic restart by a time adjustable restart relay. For packaged equipment, provide controllers including the required monitors and timed restart. Provide reduced voltage starters for all motors 25 hp and larger.

D3010 ENERGY SUPPLY

D301002 GAS SUPPLY SYSTEM

D301002 1.1 NATURAL GAS PIPING

Conform to requirements of the local natural gas utility and ASME B31.8, *Gas Transmission and Distribution Piping Systems*, for exterior piping. Conform to requirements of NFPA 54, *National Fuel Gas Code*, for interior gas piping. Provide meter and pressure regulator in accordance with the requirements of the local utility. Provide earthquake valve where required by code. Provide the complete natural gas system to the facility, including any applications and permits.

D301002 1.2 MATERIALS AND EQUIPMENT

D301002 1.2.1 Aboveground Within Buildings

Black steel meeting requirements of ASTM A 53/A 53M, Schedule 40, and associated ASME fittings threaded ends for sizes 2 inches (50 mm) and smaller; otherwise, plain end beveled for butt welding.

D301002 1.3 PRESSURE TESTS

Pressure test in accordance with NFPA 54 at 1.5 times maximum working pressure, but in no case less than 50 PSI (350 kPa).

D301002 1.4 PROPANE PIPING

If required, provide the same as specified for natural gas and comply with NFPA 58.

D301002 1.4.1 Underground

Polyethylene (PE) pipe conforming to ASTM D 2513 for 100 PSI (690 kPa) (gage) working pressure. Standard Dimension Ratio must be 11.5 maximum. Provide detectable aluminum plastic backed tape or detectable magnetic plastic tape manufactured specifically for warning and identification of direct buried piping. Tape must be detectable by an electronic detection instrument. Warning tape to be color coded with warning and identification of utility type imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (utility type) LINE BELOW" or similar wording. Color to be yellow for gas lines. Polyethylene fittings must be ASTM D 2683 socket fittings or ASTM D 2513 molded butt-fusion fittings.

D301002 1.5 PROPANE TANKS

If not provided by the propane provider, the tank material and installation must comply with NFPA 58.

D301003 STEAM SUPPLY SYSTEM (FROM CENTRAL PLANT)

Refer to Section G30, *Site Civil/Mechanical Utilities*

D301004 HOT WATER SUPPLY SYSTEM (FROM CENTRAL PLANT)

Refer to Section G30, *Site Civil/Mechanical Utilities*

D301005 SOLAR ENERGY SUPPLY SYSTEM

Design and build each solar domestic hot water heating system meeting the requirements of UFC 3-440-01 *Facility-Scale Renewable Energy Systems*. Each system must be fully integrated with the building DDC controls system.

Provide complete solar domestic hot water system designed and built by a single contractor who specializes in solar heated water systems. System must be designed, built, and tested by this contractor who is responsible for the provided system to operate as proposed. This design-build contractor must be endorsed in writing, prior to system design, by the manufacturer of the solar plate collectors provided for this solicitation.

The solar domestic hot water system designer must work with the building designers to optimize the roof area, slope and orientation available for solar domestic hot water. Coordinate with other solar systems utilizing the roof area such as photovoltaic systems.

Provide solar liquid flat plate collector systems to comply with the requirements specified in UFGS Section 48 14 13.00 20, *Solar Liquid Flat Plate and Evacuated Tube Collectors.*

D3020 HEAT GENERATING SYSTEMS

D302001 BOILERS

If required, provide Boiler(s) type for the load capacity of the building as indicated in ESR Section D30. Include all equipment efficiencies on the equipment schedules on the drawings.

D302001 1.1 REQUIREMENTS

Design and test boiler in accordance with ASME CSD-1 (Controls and Safety Devices), ASME BPVC SEC IV (Boiler and Pressure Vessel Code), NFPA 54, NFPA 70 and ANSI Z21.13/CSA 4.9. Install boiler in accordance with NBBI NB-23 PART 1. The boiler must meet the requirements of the UL 795, ANSI Z83.3, and ASME CSD. Design oil-fired boiler system in accordance with NFPA 31. Hot water boilers to meet the following thermal (Et) or combustion (Ec) efficiencies: Natural Gas-fired Hot Water rated at 88 - 732 kW (300,000 to 2,500,000 Btuh) capacity, Et = 80 percent; Natural Gas-fired Hot Water rated greater than 732 kW (2,500,000 Btuh) capacity, Ec = 82 percent; #2 Oil-fired Water rated at 88 - 732 kW (300,000 to 2,500,000 Btuh) capacity, Et = 82 percent; #2 Oil-fired Water rated greater than 732 kW (2,500,000 Btuh) capacity, Ec = 84 percent.

D302001 1.2 BOILER BURNER

Provide burners of the make, model and type certified and approved by the manufacturer of the boiler being provided. Provide burner controls and flame safety equipment conforming to either ASME CSD-1 or NFPA 58 as dictated by the input.

D302001 1.3 BOILER TRIM AND CONTROL EQUIPMENT

D302001 1.3.1 Boiler Controls

Mount controls, including operating switches, indicating lights, gages, alarms, motor starters, fuses, and circuit elements of the control systems, on a single control panel mounted on the burner or separate from the burner. Locate the separate panel at the side of the boiler or in a freestanding control cabinet away from the front of the boiler. When using BACnet communication protocol, use the ASHRAE 135 protocol without gateways to interface with the BACnet Direct Digital Control System in specifications UFGS 23 09 00, UFGS 23 09 23.02 and UFGS 23 09 13.

D302001 1.3.2 Boiler Trim

Comply with ASME BPVC SEC IV, ASME CSD-1, and additional appurtenances as specified herein.

D302001 1.3.3 Pressure Gages

Provide pressure gages with a scale equivalent to 1.5 times the outlet water pressure on supply water piping and return water piping.

D302001 1.3.4 Thermometers

Provide thermometers with a scale equivalent to 1.5 times the outlet water temperature on supply water piping and return water piping.

D302001 1.3.5 Drain Trapping

Provide drain valve and piping to a floor drain.

D302001 1.3.6 Air Vent Valve

Provide with screwed connection, stainless steel disk, and stainless steel seats to vent entrapped air.

D302001 1.4 BOILER STACK AND ACCESSORIES

Provide pre-manufactured, multi-wall stacks complying with NFPA 54 or NFPA 58 and UL-listed. Provide flue gas thermometer and mount in flue gas outlet.

D302001 1.5 BOILER STARTUP AND OPERATIONAL TESTS

D302001 1.5.1 Boiler Cleaning

Prior to startup, clean boiler(s) in accordance with ASME *Boiler and Pressure Vessel Code*and manufacturer's recommendations.

D302001 1.5.2 Operational Tests

Furnish the services of an engineer or technician approved by the boiler manufacturer for installation, startup, operational and safety testing. Demonstrate proper operability of combustion control, flame safeguard control, and safety interlocks.

D302002 FURNACES

Provide manufacturer's standard, self-contained, indirect, forced-air type.

Furnace and furnace components to be completely factory-assembled and consist of a heat exchanger; burner; centrifugal blower, a sheet metal cabinet-type casing with provisions for duct, vibration isolators, and all required operating, limit, and safety controls. Furnace casing to be factory insulated and compatible with the operating temperatures. Furnace to be provided with removable service panels which allow access to all internal components requiring cleaning, servicing, or adjustment. Provide a 24 volt control transformers, high temperature limit, and fan time delay relay. Design to supply heated air through a ducted system. If required in ESR D30, provide cooling evaporator coil module with cabinet suitable for use with furnace.

D302002 1.1 GAS-FIRED FURNACES

Furnace conforming to ANSI Z21.47/CSA 2.3. Furnace design to be certified by the AMERICAN GAS ASSOCIATION LABORATORIES (AGA). If a conventional type furnace is required in ESR D30, and the capacity is less than 65.9 kW (225,000 Btuh), the furnace must have a minimum AFUE of 78 percent. FEMP requires gas-fired warm air furnaces with a capacity greater than 65.9 kW (225,000 Btuh) have a minimum thermal efficiency of 80 percent at the maximum rated capacity. For residential applications, Energy Star requires warm air furnaces with capacity less than 65.9 kW (225,000 Btuh) have a minimum AFUE of 90 percent for US South applications, and a minimum AFUE of 95 percent for US North applications. Refer to Energy Star "Furnaces Key Product Criteria" for identification of US North and US South applications.

D302002 1.1.1 Gas-Burning Components

Gas-burning equipment to include the gas burners, ignition equipment, gas-control valve, gas piping, gas-pressure regulating valve, when applicable, and accessories necessary for a fully automatic system that is listed in CSA Directory. Gas-fired units equipped with programming controls to be furnished both with high and with low gas supply pressure switches in the fuel supply piping.

D302002 1.1.2 Ignition System

Ignition systems to be automatic electric ignition with electrically-ignited proven pilots. Continuous pilots are not permitted. Burner to be designed in accordance with NFPA 54 and located so that parts are protected against overheating. Provisions to be made in the burner housing for inspection of the pilot flame.

D302002 1.2 OIL-FIRED FURNACES

Furnace conforming to UL 727. Oil-fired furnaces with a capacity less than 65.9 kW (225,000 Btuh) require a minimum AFUE of 78 percent. FEMP requires oil-fired warm air furnaces with a capacity greater than 65.9 kW (225,000 Btuh) have a minimum thermal efficiency of 81 percent at the maximum rated capacity. For residential applications, Energy Star requires oil-fired warm air furnaces with capacity less than 62.9 kW 225,000 Btuh have a minimum AFUE of 85 percent.

D302002 1.2.1 Oil-Burning Components

The equipment to include the oil burner motor, ignition equipment safety devices, and accessories necessary for a full automatic system

that conforms to UL 296. Oil-fired units equipped with programming controls to be furnished with low oil-pressure switches in the fuel supply piping. Oil-fired units not equipped with programming controls to be equipped with a delayed opening oil shutoff valve. The valve must automatically delay delivery of oil to the burner until such time as the combustion air fan and, when applicable, the induced draft fan is operating at rated speed.

D302002 1.2.2 Ignition System

Ignition systems for oil-fired units to be of the direct-electrical spark type or interrupted type in accordance with UL 296.

D302004 AUXILIARY EQUIPMENT

D302004 1.1 HEAT EXCHANGERS

Steam to hot water converter as required for the application. Provide factory assembled, u-tube units constructed in accordance with ASME BPVC for steam or hot water. Factory assembled, plate type heat exchangers may be provided for hot water.

D302004 1.2 CONDENSATE RETURN UNITS

Floor-mounted receiver and duplex pump unit.

D302005 EQUIPMENT THERMAL INSULATION

Insulate hot water pumps and equipment as suitable for the temperature and service in rigid block, semi-rigid board, or flexible unicellular insulation to fit as closely as possible to equipment.

D3030 COOLING GENERATING SYSTEMS

If coatings are indicated in ESR Section D30, provide with copper tube/copper fin construction or immersion applied, baked phenolic or other approved coating that passes the 3000 hour salt spray resistance test using the ASTM B117 procedure. Field applied coatings are not acceptable.

D303001 CHILLED WATER SYSTEMS

D303001 1.1 AIR-COOLED CHILLERS

Provide air-cooled chillers of type indicated in Project Program and meet the requirements of AHRI 550/590. For electric air cooled chillers use minimum full load and part load efficiency ratings specified by ASHRAE 90.1-2013 Table 6.8.1-3. Provide control panel with the manufacturers' standard controls and protection circuits. If DDC system is required in project, provide a control interface for remote monitoring of the chiller's operating parameters, functions and alarms from the DDC control system central workstation. When using BACnet communication protocol, use the ASHRAE 135 protocol without gateways to interface with the BACnet DDC system in specifications UFGS 23 09 00, UFGS 23 09 23.02 and UFGS 23 09 13.

D303001 1.1.1 Stages

Provide continuous variable speed compressor adjustment to match actual load, or minimum of four stages of unloading at 25 percent per stage minimum for centrifugal, and scroll chillers. Provide scroll units with hot gas bypass.

D303001 1.1.2 Pressure Control

Provide head pressure control for cold temperature operation. Provide freeze protection for chiller and piping.

D303001 1.1.3 Coil Construction

Provide copper tube, aluminum fins for condenser coils. Provide manufacturer's optional louvered covers or hail guards for condenser coils to provide protection against vandalism, debris, or hail.

D303001 1.2 WATER-COOLED CHILLERS

Self-contained chiller meeting the requirements of AHRI 550/590. For electric water cooled positive displacement chillers less than 300 tons use minimum full load and part load efficiency ratings specified by ASHRAE 90.1-2013 Table 6.8.1-3. For electric water cooled positive displacement chillers greater than 300 tons and electric water cooled centrifugal chillers, use minimum full load and part load efficiency ratings specified by FEMP, which is located at the following DOE FEMP webpage: http://energy.gov/eere/femp/covered-product-category-water-cooled-electric-chillers . Provide control panel with the manufacturers' standard controls and protection circuits. If DDC system is required in project, provide a control interface for remote monitoring of the chiller's operating parameters, functions and alarms from the DDC control system central workstation. Provide automatic capacity-reduction system for stable operation from 100 to 10 percent of full load capacity. When using BACnet protocol, use the ASHRAE 135 protocol without gateways to interface with the BACnet DDC system in specifications 23 09 00, 23 09 23.02 and 23 09 13.

D303001 1.3 COOLING TOWERS

Factory assembled, conforming to NFPA 214. Fire hazard rating for plastic impregnated materials must not exceed 25. Provide Cooling Technology Institute 201 certification of tower capability and performance. Cooling Tower performance must meet or exceed that listed in ASHRAE 90.1. Construct as indicated in ESR Section D30 with fill material of PVC formed sheets. Provide stainless steel hardware. Provide vibration cutout switch interlocked with the fan motor. Provide 2-speed or adjustable frequency drive fan motors. Provide work platform(s) at all locations in the tower that require periodic maintenance. For multi-cell installations, provide isolation valves on inlets and outlets of each cell. Provide eliminators in the tower outlet to limit drift loss to not over 0.002 percent of the circulating water rate for counterflow towers, or 0.005 percent of the circulating water rate for cross-flow towers. Eliminators to be constructed of not less than 3/8 inch (10 mm) lumber or polyvinyl chloride (PVC).

D303001 1.4 CLOSED CIRCUIT COOLERS

Factory assembled, conforming to NFPA 214. Fire hazard rating for plastic

impregnated materials must not exceed 25. Provide Cooling Technology Institute 201 certification of tower capability and performance. Cooler performance must meet or exceed that listed in ASHRAE 90.1. Provide stainless steel hardware. Provide vibration cutout switch interlocked with the fan motor. Provide 2-speed or adjustable frequency drive fan motors. Meet OSHA safety requirements for stairs and handrails.

D303002 DIRECT EXPANSION SYSTEMS

If coatings are indicated in ESR Section D30, provide with copper tube/copper fin construction or immersion applied, baked phenolic or other approved coating that passes the 3000 hour salt spray resistance test using the ASTM B117 procedure. Field applied coatings are not acceptable.

D303002 1.1 CONDENSING UNITS

Air-cooled, split system, ductless air conditioner. Provide units factory assembled, designed, tested, and rated in accordance with AHRI 210/240 or AHRI 340/360. Condensing units with capacities greater than or equal to 135,000 Btuh to meet the minimum efficiency requirements specified by ASHRAE 90.1-2013 Table 6.8.1-1 "Electrically Operated Unitary Air Conditioners and Condensing Units". Provide manufacturer's minimum recommended clearance around condensing units. Size refrigerant piping in accordance with the manufacturer's recommendations.

D303002 1.2 DUCTLESS SPLIT SYSTEM

Air-cooled, ductless split system. Provide units factory assembled, designed, tested, and rated in accordance with ARI 210/240. Provide manufacturer's minimum recommended clearance around heat pump or condensing units. Size refrigerant piping in accordance with the manufacturer's recommendations. Insulate refrigerant piping suction lines and condensate drain.

D303002 1.4.1 Light Commercial Air Conditioner, Three-Phase, Ductless Split Systems

In order to meet Energy Star requirements, ductless split system air conditioners smaller than 65,000 Btuh require a minimum SEER of 14 and EER of 12; ductless split system air conditioners that have an electric resistance heating section (or no heating) and are sized from 65,000 Btuh up to 240,000 Btuh to have an EER of 11.7 and an IEER of 11.8; all other air conditioners sized from 65,000 Btuh up to 240,000 Btuh to have an EER of 11.5 and IEER of 11.6.

D303002 1.4.2 Light Commercial Heat Pump, Three-Phase, Ductless Split Systems

In order to meet Energy Star requirements, ductless split system heat pumps smaller than 65,000 Btuh require a minimum SEER of 14, EER of 11, and HSPF of 8.2; ductless split system heat pumps that have an electric resistance heating section (or none) and are sized from 65,000 Btuh up to 135,000 Btuh to have an EER of 11.3, an IEER of 11.4, and a COP of 3.35 (rated at 47 deg F); ductless split system heat pumps that have an electric resistance heating section (or none) and are sized from 135,000 Btuh up to 240,000 Btuh to have an EER of 10.9,

an IEER of 11, and a COP of 3.25 (rated at 47 deg F).

D303002 1.3 VARIABLE REFRIGERANT FLOW SYSTEMS

Provide a complete system consisting of VRF heat pump units, branch circuit controllers, VRF fan coil units, and associated controls. Provide inverter driven heat pump units that utilize R410A refrigerant. In order to meet Energy Star requirements, heat pumps smaller than 65,000 Btuh require a minimum SEER of 14, EER of 11, and HSPF of 8.2; heat pumps that have an electric resistance heating section (or none) and are sized from 65,000 Btuh up to 135,000 Btuh to have an EER of 11.3, an IEER of 11.4, and a COP of 3.35 (rated at 47 deg F); heat pumps that have an electric resistance heating section (or none) and are sized from 135,000 Btuh up to 240,000 Btuh to have an EER of 10.9, an IEER of 11, and a COP of 3.25 (rated at 47 deg F). On the branch circuit controllers, include multiple branch connections allowing for simultaneous heating and cooling utilizing hot gas refrigerant or sub-cooled liquid. The total capacity of the branch controllers must be between 50 and 150 percent of the rated capacity.

Size and install refrigerant piping in strict compliance with the manufacturer's requirements. Refrigerant piping must be clean, dry, and leak free. Prior to installation all refrigerant pipes must remain sealed. During installation and prior to filling, use nitrogen to maintain cleanliness and prevent oxidation and scaling while brazing. Install each system to provide proper oil return. Refrigerant piping must be copper, ACR type, ASTM B280. All joints must be sil-brazed. All thicknesses of piping must remain the same throughout the system. Individually pressure test and commission each refrigerant circuit. Perform pressure testing using nitrogen at 1-1/2 times the system operating pressure. Design each system to meet Refrigerant Piping and Heat Transfer Components ASME B31.9, Building Services Piping Code and design to allow for expansion and contraction.

D3040 DISTRIBUTION SYSTEMS

D304001 AIR DISTRIBUTION, HEATING & COOLING

D304001 1.1 DUCTWORK

Except as specified herein, provide ductwork constructed, braced, reinforced, installed, supported, and sealed in accordance with SMACNA standards.

D304001 1.1.1 Flexible Ducts

Use insulated flexible duct only for connections to air distribution devices to adapt to minor offsets. Flexible duct must be UL 181 listed and in conformance with SMACNA 1966 duct construction standards with a minimum R value of 4. Limit flexible ductwork to maximum of 5 feet (1.5 meters) in length.

D304001 1.1.2 Flexible Connections

Provide flexible connectors between fans and ducts.

D304001 1.1.3 Volume Dampers

Provide manual volume dampers in each branch take-off from the main duct to control air quantity except for primary supply ductwork on VAV systems. Dampers must conform to SMACNA 1966 duct construction standards and must be seal class "A" construction.

D304001 1.1.4 Fire Dampers

Fire dampers must be rated in accordance with UL 555. Fire dampers must be dynamic type rated for closure against a moving airstream. Provide fire dampers that do not intrude into the air stream when in the open position.

D304001 1.1.5 Smoke Dampers

Smoke dampers must be rated in accordance with UL 555S.

D304001 1.1.6 Sound Attenuators

Fabricated attenuators that will reduce the rated sound pressure level of the fan down to at least 65 decibels in the 250 Hz (third octave band) center frequency by using a reference sound source calibrated in decibels of sound power at 10 to 12 watts. Maximum permissible pressure drop must not exceed 0.63 inch of water (157 Pa).

D304001 1.2 LOUVERS & HOODS

D304001 1.2.1 Louvers

Louvers must bear AMCA ratings seal for air performance and water penetration in accordance with AMCA 500L and AMCA 511. Louvers must be constructed of anodized aluminum alloy or stainless steel. Provide birdscreens.

D304001 1.3 GRILLES, REGISTERS, & DIFFUSERS

Factory-finished grilles, registers, and diffusers. Exterior and exposed edges must be rolled, or otherwise stiffened and rounded.

D304001 1.4 INSULATION

Provide external thermal insulation for all ductwork. Insulate ductwork in concealed spaces with blanket flexible mineral fiber. Insulate ductwork in Mechanical Rooms and exposed locations with rigid mineral fiber insulation.

Provide insulation with factory applied all-purpose jacket with integral vapor retarder. In exposed locations, provide a jacket with white surface suitable for painting. Flame spread/smoke developed rating for all insulation must not exceed 25/50. Minimum insulation thickness must be the minimum thickness required by ASHRAE 90.1. Insulate the backs of all supply air diffusers with blanket flexible mineral fiber insulation.

D304001 1.5 VAV BOXES

Pressure-independent type variable air volume units rated in accordance with AHRI 880. Boxes must not be allowed to fully shut-off. Provide each box

with a heating coil unless not required by space reheat or heating. Provide electronic controls.

D304001 1.6 VARIABLE AIR VOLUME VAV FAN-POWERED UNITS

Pressure-independent, fan powered, VAV units rated in accordance with AHRI 880 and UL listed. Provide each box with a heating coil. Provide electronic controls with speed controller, discharge volume control damper(s), and return/recirculation air frame and filter. If discharge dampers are not provided with the unit, coordinate installation with the sheet metal contractor. Insulate in accordance with ASHRAE 90.1.

D304002 STEAM DISTRIBUTION SYSTEMS

D304002 1.1 STEAM PIPING

ASTM A 106/A 106M or ASTM A 53/A 53M Grade B, Schedule 40, black steel, electric-resistance welded or seamless.

D304002 1.2 CONDENSATE RETURN PIPING

ASTM A 106/A 106M or ASTM A 53/A 53M, Grade B, Schedule 80, black steel, electric-resistance welded or seamless.

D304002 1.3 STEEL PIPE FITTINGS

For piping 2 inch (50 mm) and smaller, provide ASME B16.3 malleable iron screwed fittings or ASME B16.11 socket welding (Class 3000) or threaded type (Class 2000). Provide ASME B16.9 butt-welding fittings or ASME B16.5 flanged type for piping 2-1/2 inch (63 mm) and larger.

D304002 1.4 INSULATION

Insulate steam and condensate return piping with mineral fiber or cellular glass insulation with all-purpose jacket.

D304002 1.5 STEAM PRESSURE REDUCING STATION

For each building, provide steam pressure reducing station(s).

D304002 1.6 STEAM TRAPS

Provide steam traps and accessories in accordance with UFC 3-401-01.

D304003 HOT WATER DISTRIBUTION SYSTEMS

D304003 1.1 HOT WATER PIPING

Electric resistance welded or seamless Schedule 40 black steel pipe conforming to ASTM A 53/A 53M. Piping 4 inch (100 mm) and smaller may be ASTM B 88 Type K or L copper.

D304003 1.2 STEEL PIPE FITTINGS

For piping 2 inch (50 mm) and smaller, provide ASME B16.3 malleable iron screwed fittings or ASME B16.11 socket welding (Class 3000) or threaded type

(Class 2000). Provide ASME B16.9 butt-welding fittings or ASME B16.5 flanged type for piping 2-1/2 inch (63 mm) and larger.

D304003 1.3 COPPER FITTINGS

ASME B16.18 cast bronze solder joint type or ASME B16.22 wrought copper solder joint type.

D304003 1.4 ISOLATION VALVES

Provide isolation valves on supply and return lines at take-offs for service to each building(s). Locate valves in valve boxes.

D304003 1.5 INSULATION

Insulate hot water piping with mineral fiber insulation with factory-applied all-purpose jacket. Provide aluminum metal wrap over insulation for all exterior piping.

D304003 1.6 VALVES

Provide shut off valves, appropriately sized relief valves, and appropriately sized balancing valves as necessary to balance water flows, protect components and isolate equipment for service and repairs.

D304003 1.7 APPURTENANCES

Provide appurtenances such as air separators, expansion tanks, suction diffusers, strainers, and other required features to allow for proper operation of hot water systems.

D304003 1.8 TEST PORTS

Provide test ports in piping at inlet and outlet of all major system components including boilers, pumps, and other equipment as required.

D304006 CHILLED / CONDENSER WATER DISTRIBUTION SYSTEMS

D304006 1.1 ABOVEGROUND CHILLED AND CONDENSER WATER PIPING

Aboveground chilled water piping must be electric resistance welded or seamless Schedule 40 black steel pipe conforming to ASTM A 53/A 53M. Piping 4 inch (100 mm) and smaller may be ASTM B 88 Type K or L copper.

D304006 1.2 STEEL PIPE FITTINGS

For piping 2 inch (50 mm) and smaller, provide ASME B16.3 malleable iron screwed fittings or ASME B16.11 socket welding (Class 3000) or threaded type (Class 2000). Provide ASME B16.9 butt-welding fittings or ASME B16.5 flanged type for piping 2-1/2 inch (63 mm) and larger.

D304006 1.3 COPPER FITTINGS

ASME B16.18 cast bronze solder joint type or ASME B16.22 wrought copper solder joint type.

D304006 1.4 ISOLATION VALVES

Provide isolation valves on supply and return lines at take-offs for service to each building(s). Locate valves in valve boxes.

D304006 1.5 INSULATION

Insulate chilled water pumps and accessories for the temperature and service in rigid block, semi-rigid board, or flexible unicellular insulation to fit as closely as possible to equipment. Insulate above ground chilled water piping with cellular glass insulation (ASTM C 552, Type II, and Type III). Insulate condenser water piping with mineral fiber insulation. Provide all-purpose jacket with vapor retarder. Provide aluminum metal wrap over insulation for all exterior piping.

D304006 1.6 VALVES

Provide shut off valves, appropriately sized relief valves, and appropriately sized balancing valves as necessary to balance water flows, protect components and isolate equipment for service and repairs.

D304006 1.7 TEST PORTS

Provide test ports in piping at inlet and outlet of all major system components including chillers, pumps, and other equipment as required.

D304007 EXHAUST SYSTEMS

D304007 1.1 FANS

AMCA 210 certified, with AMCA seal. Fan bearings must have a minimum average life of 200,000 hours at design operating conditions. Provide bird screens for outdoor inlets and outlets. Provide direct-drive type fans with means for verifying operation via the building DDC system or with speed controllers

D304007 1.2 IN-LINE FANS

UL-Listed centrifugal fans.

D304007 1.3 WALL FANS

Propeller fans with fan guards. Provide centrifugal fans with backdraft dampers and wall bracket.

D304008 AIR HANDLING UNITS

AMCA 210 certified fans with AMCA seal. Fan bearings must have a minimum average life of 200,000 hours at design operating conditions. Provide bird screens for outdoor inlets and outlets.

D304008 1.1 CENTRAL STATION AIR HANDLERS

Modular construction, double wall air handling units with minimum of 1 inch (25 mm) casing insulation. Provide AHRI 430 certified fans and AHRI certified coils. Provide stainless steel, positive draining condensate drain pan. For 100 percent outside air units provide capability for

cooling, heating, dehumidification and reheat.

D304008 1.1.2 Dedicated Outside Air System (DOAS)

Provide package or modular air handling unit specifically designed for conditioning 100% outside air. Provide controls and hardware necessary for controlling ventilation air to the point of use at a specific dry bulb temperature and relative humidity. Provide with supply and exhaust/return fan with heat recovery element if called for. Provide with DX or chilled water cooling/dehumidification coil. Provide with modulating hot refrigerant gas or hot water reheat coil.

D304090 OTHER DISTRIBUTION SYSTEMS

D304090 1.1 PUMPS

Centrifugal circulating pumps with motor, motor starter, and motor enclosure conforming to the appropriate NEMA standards. Provide suction diffusers on base-mounted pumps. Insulate pumps used for hot service and chilled water service.

D304090 1.1.1 In-Line Pumps

Pumps constructed of manufacturer's standard materials suitable for chilled, condenser, and hot water heating systems.

D304090 1.1.2 Base Mounted Pumps

Single stage end suction pumps suitable for chilled, condenser, and hot water heating systems.

D304090 1.2 VARIABLE FREQUENCY DRIVES (VFD)

Factory-assembled variable frequency drive control systems for variable speed control. Provide all air handling unit and pump VFD's from the same manufacturer. Each VFD must include motor starter, motor disconnects and controls as required for a complete system. Units must be UL-listed and comply with the National Electric Code.

Provide the following accessories:

Disconnect switch

Control circuit transformer, with primary and secondary fuses

Manual bypass

System hand-off-auto switch with provisions for remote start/stop of the system.

System initialized light

Run light

Failure alarm

LCD digital display with numeric keypad

Provide a control interface for remote monitoring of VFD functions and alarms from the DDC control system computer.

D304090 1.3 AIR SEPARATORS

ASME rated air separators with tangential inlet and outlet connections and automatic air vent.

D304090 1.4 SOLIDS SEPARATORS

Provide centrifugal solids separator with automatic drain in open systems.

D304090 1.5 EXPANSION TANKS

ASME rated expansion tanks with polypropylene or butyl diaphragm or compression tanks as indicated in UFC 3-401-01.

D304090 1.6 MAKE-UP WATER STATION

Provide station consisting of a water pressure-reducing valve and a relief valve in the make-up water line to the chilled and hot water systems to maintain the operating pressure. Provide a 3/4 inch (20 mm) globe valve by-pass around this pressure reducing station. Provide reduced pressure backflow preventer upstream of the by-pass.

D304090 1.7 CONDENSATE DRAIN PIPING

ASTM B 88, Type M or L, hard drawn copper.

D304090 1.8 CONDENSATE DRAIN INSULATION

Insulate condensate drain piping with flexible cellular insulation.

D304090 1.9 CHEMICAL TREATMENT

If required, Provide chilled and hot water systems with automatic chemical treatment system for the control of pH, scale formation, and corrosion inhibition. Provide shot-type feeders for manual chemical feed. Feeders must be rated for use with pressures up to 130 PSI (900 kPa) (gage). Provide condenser water systems with automatic chemical treatment systems that monitor conductivity, and pH, and provide for water metering and bleed-off. Provide chemicals in accordance with EPA and equipment manufacturer’s recommendations.

D304090 1.10 PIPING IDENTIFICATION

Provide piping identification labels or Stencil names or code letters for piping systems in clearly visible letters and symbols. Provide arrow-shaped markings to indicate direction of flow.

D304090 1.11 PIPE SLEEVES

Provide pipe sleeves at each wall and floor penetration. The sleeve must

be of a material suitable to protect the carrier pipe (two pipe sizes larger) and sealed with an appropriate flexible material. Provide fire stopping in fire rated walls in accordance with IBC.

D304090 1.12 SYSTEM FLUSHING

Thoroughly flush hydronic systems prior to system startup. Isolate coils during initial flushing until water is clear.

D304090 1.13 HEAT TAPE

UL-Listed, self-regulating, heat tape on piping subject to freezing.

D305003 FAN COIL UNITS

UL-Listed, factory assembled and tested fan coils, AHRI 440 and AHRI certified.

D305005 ELECTRIC HEATING

D305005 1.1 UNIT HEATERS

Factory assembled, UL-1025, unit heaters.

D3060 CONTROLS AND INSTRUMENTATION

D306001 HVAC CONTROLS

D306001 1.1 DIRECT DIGITAL CONTROLS

Provide one of the following as directed in ESR Section D30.

a. Provide Direct Digital Controls (DDC) to comply with the requirements specified in UFGS Sections 23 09 00, *Instrumentation and Control for HVAC*, 23 09 23.02, *BACnet Direct Digital Control for HVAC and Other Building Control Systems*, and 23 09 13, *Instrumentation and Control Devices for HVAC*.
b. Provide and integrate Direct Digital Controls (DDC) in accordance with Part 3 Chapter 6 D306001 1.1 DIRECT DIGITAL CONTROLS in compliance with requirements specified in UFGS Sections 23 09 00, *Instrumentation and Control for HVAC*, 23 09 23.02, *BACnet Direct Digital Control for HVAC and Other Building Control Systems*, 23 09 13, *Instrumentation and Control Devices for HVAC*, and UFGS 25 10 10, *Utility Monitoring and Control System (UMCS) Front End and Integration.*

The Designer of Record must use UFGS Sections 23 09 00, 23 09 23.02, and 23 09 13 if using BACnet protocol, and submit the edited specification sections as a part of the project design submittal.

Design requirements must be in accordance with all specification notes and the BAS Owner must be identified and designated early in the design documentation.

System must include stand alone digital controllers, a communication network, and a workstation computer with control software. Provide stand-alone control routines that operate without connection to the network during a loss of communication. Provide trending, scheduling and alarm

tables (may be included with the sequence of operation). Provide reset routines (based on outdoor air temperature or zone demand) for hot water loop temperature setpoints and supply air static pressure control. Use alarming and trending services during performance testing or commissioning. Alarm every sequence routine when out-of-limits or control/response failure occurs. Display all graphic floor plans, equipment graphics, DDC ladder diagrams, and sequence of operations graphic pages.

All 120-volt wiring must comply with NFPA 70. All 24-volt wiring must comply with the IMC and terminal device manufacturer's recommendations.

Provide training on the installed system according to the maximum training days in UFGS 23 09 00, UFGS 23 09 23.02 and UFGS 23 09 13. Demonstrate all operator workstation functions requiring BACnet services, i.e., navigating through the graphic displays, trending, alarming and monitoring of the new controls system from the existing operator workstation using only the existing application software and without the need to launch other applications or logon to other vendor applications.

D306001 1.2 ELECTRONIC CONTROLS

If required, provide programmable thermostats with built in keypads for scheduling of day and night temperatures with two setback periods per day. Provide independent summer and winter programs. Thermostats must have temporary and manual override of schedule and battery backup.

D3070 SYSTEMS TESTING AND BALANCING

D3070 1.1 HVAC SYSTEM

Provide HVAC systems testing and balancing that complies with the requirements specified in UFGS Specification Section 23 05 93, *Testing, Adjusting, and Balancing for HVAC*. The Designer of Record must prepare UFGS Specification Section 23 05 93, as a part of the project specification and include the prepared specification section in the design submittal for the project.

D3090 OTHER HVAC SYSTEMS AND EQUIPMENT

D309001 GENERAL CONSTRUCTION ITEMS

D309001 1.1 SEISMIC DESIGN

Provide in accordance with UFC 3-401-01, *Mechanical Engineering*.

D309002 REFRIGERATION SYSTEMS

D309090 OTHER SPECIAL MECHANICAL SYSTEMS

D309090 1.1 ENERGY RECOVERY WHEELS

Total energy (enthalpy) type energy recovery wheels (heat wheels). Media must be aluminum or a lightweight polymer coated with a corrosion-resistant finish. Etched or oxidized surfaces are not acceptable. Heat transfer surfaces must be coated with a non-migrating (permanently bonded) absorbent specifically developed for the selective transfer of water vapor. Equal

sensible and latent recovery efficiencies must be documented through a certification program conducted in accordance with ASHRAE 84 and AHRI 1060. The energy recovery wheel must have an insulated housing of double wall construction, rotor seals that are specifically designed to limit cross-contamination, and a rotation detector. Should rotation stop, the rotation detector must alarm the HVAC control system. Filter sections must be readily accessible for maintenance.

D309090 1.2 HEAT PIPES

Factory fabricated, assembled and tested heat pipes with counter-flow arrangement. Provide hermitically sealed, seamless aluminum tube cores with extended surfaces. Heat exchanger frame must be constructed of not less than 16-gage galvanized steel and fitted with intermediate tube supports, and flange connections. Provide tube end covers and a partition of galvanized steel to separate exhaust and supply air streams without cross-contamination. A refrigerant must be used as the working fluid. Type I refrigerants are not allowed.

-- End of Section --

SECTION D40

FIRE PROTECTION
12/18

D40 GENERAL

RFP Part 3 including the Engineering System Requirements (ESR) provide project specific requirements. The RFP Part 4, Performance Technical Sections (PTS) provide generalized technical requirements that apply to multiple facility types and include more requirements than are applicable to any one project. Therefore, only the RFP Part 4 requirements that apply to the project and further define the RFP Part 3 project specific requirements are required.

D40 1.1 DESIGN GUIDANCE

Provide the design and installation of fire protection systems in accordance with the following references. This Performance Technical Specification (PTS) adds clarification to the fundamental requirements contained in the following Government Standards. The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification.*

D40 1.1.1 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Builidng Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC:
UFC 3-600-01	Fire Protection Engineering for Facilities
UFC 1-200-02	High Performance and Sustainable Building Requirements

D40 1.2 QUALITY ASSURANCE

Materials and assemblies installed in the work must be inspected and found to be in compliance with industry standards and these specifications prior to acceptance of the work. Items found not to be in compliance must be removed, or corrective measures taken, to assure compliance with the referenced standard.

Submit Qualifications, Training Plans, and Test Plans and Procedures indicated herein 45 calendar days prior to the expected date of execution.

Notify the Contracting Officer 14 calendar days prior to all testing. Submit test results within 7 calendar days of completion of testing.

D40 1.2.1 Qualified Workers

D40 1.2.1.1 Fire Protection Designer of Record

Services and qualifications of the FPDOR must be as specified in UFC 3-600-01 and UFC 3-600-10N. The FPDOR must review and approve all fire protection engineering submittals.

D40 1.2.1.2 Fire Protection Engineering Technicians

Workers required herein to be certified by the National Institute for Certification in Engineering Technologies (NICET) as an engineering technician in the Fire Protection Engineering Technology program must be thoroughly trained and experienced, and completely familiar with the specified requirements and the methods needed for proper performance of the work in this section. All documentation required to be submitted for record and/or approval must include the NICET engineering technician's signature, along with the technician's current NICET certification number, certification subfield, and level.

Installation drawings, shop drawings or working plans, calculations, other required pre-construction documentation and as-built drawings must be prepared by, or under the direct supervision of a NICET engineering technician as specified in Section 6 D40 of Part 3.

D40 1.2.1.3 Qualified System Installers

Fire Suppression System and Fire Alarm System installers must be regularly engaged in the installation of the type and complexity of system specified in the Contract documents, and have served in a similar capacity for at least three systems that have performed in the manner intended for a period of not less than 6 months.

Installers of Chlorinated Poly Vinyl Chloride (CPVC) sprinkler systems must be certified by the manufacturer and maintain a copy of their certification on hand at all times.

D40 1.2.1.4 Fire Protection QC Specialist

The Fire Protection (FP) QC Specialist must be a U.S. Registered Fire Protection Engineer (FPE) and be an integral part of the Prime Contractor's Quality Control Organization. This FPE cannot have any business relationships (owner, partner, operating officer, distributor, salesman, or technical representative) with any fire protection equipment device manufacturers, suppliers or installers for any such equipment provided as part of this project. The Fire Protection Designer of Record (FPDOR) may serve as the FPQC Specialist provided the following qualifications are met.

a. Qualifications/Experience: The FPQC Specialist must have obtained their professional registration by successfully completing the Fire Protection Engineering discipline examination. This FPE shall have a minimum of 5 years full time and exclusive experience in every aspect of facility design and construction as it relates to fire protection, which includes, but is not limited to, building code analysis, life safety code analysis, design of automatic detection and suppression systems, passive fire protection design, water supply analysis, and a multi-discipline coordination reviews, and construction surveillance.

b. Area of Responsibility: The FPQC Specialist is responsible for assuring the proper construction and installation of life safety and fire protection features across all disciplines and trades. The FPQC Specialist is responsible for assuring that life safety and fire protection features are provided in accordance with the design documents, approved construction submittals, and manufacturer's requirements. Examples include, but are not limited to, water distribution systems including fire pumps and fire hydrants, fire resistive assemblies such as spray-applied fire proofing of structural components and fire rated walls/partitions, fire alarm and detection systems, fire suppression and standpipe systems, and emergency and exit lighting fixtures.

c. Construction Surveillance: The FPQC Specialist must visit the construction site as necessary to ensure life safety and fire protection systems are being constructed, applied, and installed in accordance with the approved design documents, approved construction submittals, and manufacturer's requirements. Frequency and duration of the field visits are dependent upon particular system components, system complexity, and phase of construction. At a minimum, field visits must occur just prior to installation of suspended ceiling system to inspect the integrity of passive fire protection features and fire suppression system piping, preliminary inspections of fire alarm/detection and suppression systems, and final acceptance testing of fire alarm/detection and suppression systems. The FPQC Specialist must prepare a written report detailing compliance of any outstanding submittal review comments, summarizing the results of all tests, detailing all discrepancies discovered, corrective action taken, all forms as required by the respective NFPA codes, and recommendations/certifications for acceptance. Forward one copy of the report with attachments to the Naval Facilities Engineering Command Fire Protection Engineer.

D40 1.2.2 Performance Verification Testing

Operational tests are required on all systems to demonstrate compliance with contract requirements and respective NFPA codes, International Building Code and as noted below. Test procedures must be in full compliance with the respective NFPA codes, the equipment manufacturer recommendations, and UFC 3-600-10N. Provide all

personnel, equipment, and materials for tests. Return trips to witness repeat acceptance tests due to failure of previous tests will be at the Contractor's expense.

D40 1.2.2.1 Preliminary Inspections and Final Acceptance Testing

The FPQC Specialist must personally witness all preliminary inspections of fire alarm/detection and suppression systems. Once preliminary inspections have been successfully completed, the FPQC Specialist must submit a signed certificate to the QC Manager that systems are ready for final inspection and testing. The Naval Facilities Engineering Command Fire Protection Engineer will witness formal tests and approve all systems before they are accepted. The QC Manager must submit the request for formal inspection at least 15 days prior to the date the inspection is to take place. The QC Manager must provide 10 days advance notice to the Contracting Officer and the activity Fire Inspection Office of scheduled final inspections.

D40 1.2.2.2 Final Life Safety/Fire Protection Certification

The FPQC Specialist must provide certification that all life safety and fire protection systems have been installed in accordance with the contract documents, approved submittals, and manufacturer's requirements. This certification is to summarize all life safety and fire protection features, and must bear the professional seal of the FPQC Specialist.

D40 1.2.2.3 System Manufacturers Representatives

The systems manufacturer technical representative must be present for the final inspection and test for the following systems: fire alarm and detection, fire pump.

D40 1.2.2.4 Fire Suppression Water Supply and Equipment

Inspect fire hydrants prior to backfilling the trench surrounding the fire hydrants. Provide a report, including pictures, to the Contracting Officer.

Conduct fire pump tests in the presence of the pump, controller, and engine manufacturer technical representatives. The fire pump manufacturer's representative must also be present for the preliminary test of the fire pump system.

D40 1.2.2.5 Spray-Applied Fire Proofing and Fire Stopping

See Section C1030 for requirements.

D40 1.2.3 Training

Provide training for the active systems within 6 weeks of final acceptance of the systems. Schedule the training at least 2 weeks in advance.

D40 1.3 DESIGN SUBMITTALS

Submit design submittals in accordance with Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, FC 1-300-09N, *Navy and Marine CorpsDesign Procedures*and UFC 3-600-10N, *Fire Protection Engineering*.

D40 1.4 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*. In addition to the Z10 requirements, the Designer of Record (DOR) must approve the following construction submittals as a minimum:

All fire protection engineering submittals including:

a. Shop Drawings. Provide shop drawings for all systems.
b. Product Data. Provide product data for all equipment.
c. Design Data. Provide design data for all system calculations.
d. Test Reports
e. Certificates

D4010 FIRE ALARM AND DETECTION SYSTEMS

D401001 FIRE ALARM DISTRIBUTION

D401001 1.1 REMOTE ANNUNCIATORS

Remote annunciators must have a minimum 80 character alphanumeric display with alarm acknowledge, alarm silence, and reset functions.

D401001 1.2 TRANSMITTED SIGNALS

Provide the following signals to be sent to the fire alarm receiving station:

a. Sprinkler Water Flow
b. Smoke Detector
c. Manual Pull Station
d. Supervisory (i.e., valve tamper switch, fire pump loss of power, fire pump phase reversal)
e. Duct Smoke Detector
f. Fire Pump Running
g. Sleeping Room Smoke Detector

D4020 FIRE SUPPRESSION WATER SUPPLY AND EQUIPMENT

D402001 FIRE PROTECTION WATER PIPING AND EQUIPMENT

The design point of connection to the existing water supply requires the approval of the Contracting Officer. The FP DOR must conduct additional flow tests after contract award prior to any design submissions. Conduct tests under the supervision of the Contracting Officer.

D4040 SPRINKLERS

D404001 SPRINKLERS & RELEASING DEVICES

D404001 1.1 DESCRIPTION

Provide a dry pipe system for areas subject to freezing. Loading docks may be protected with dry-type sidewall sprinklers supplied by the wet-pipe system.

D404001 1.2 REQUIREMENTS

Utilize upright sprinklers with ordinary temperature rating and color to match finish in normally occupied rooms without a finished ceiling (i.e., laboratories, and other spaces with exposed ceilings).

SECTION D50

ELECTRICAL
09/22

D50 GENERAL

RFP Part 3, including the Engineering System Requirements (ESR) provides project specific requirements. The RFP Part 4, Performance Technical Specifications (PTS), provides generalized technical requirements that apply to multiple facility types and include more requirements than are applicable to any one project. Therefore, only the RFP Part 4 requirements that apply to the project and further define the RFP Part 3 project specific requirements are required.

D50 1.1 NARRATIVE

This section covers installations inside the facility and out to the five foot line. See PTS Section G40, *Site Electrical*, for continuation of systems beyond the five foot line.

D50 1.2 ELECTRICAL DESIGN GUIDANCE

Provide the design and installation in accordance with the following references. This Performance Technical Specification (PTS) adds clarification to the fundamental requirements contained in the following Government Standards. The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification*.

When all product Quality Control information is included in the Unified Facility Criteria (UFC) and there are requirement options identified in the ESR, then the Uniformat Level 4 titles (and possible subtitles) are included without additional verbiage. One example of this is D501090, OTHER SERVICE AND DISTRIBUTION.

D50 1.2.1 Government Publications

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	General Building Requirements(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s):UFC 3-501-01, Electrical Engineering)
UFC 1-200-02	High Performance and Sustainable Building Requirements
UFC 3-580-10	Navy and Marine Corps Intranet (NMCI) Standard Construction Practices

UNIFIED FACILITIES GUIDE SPECIFICATIONS (UFGS)

UFGS 26 23 00	Low-Voltage Switchgear
UFGS 26 24 13	Switchboards
UFGS 26 29 23	Adjustable Speed Drive (ASD) Systems Under 600 Volts
UFGS 26 32 15.00	Engine-Generator Set Stationary 15-2500KW, with Auxiliaries
UFGS 26 33 53	Static Uninterruptible Power Supply (UPS)
UFGS 26 36 23	Automatic Transfer Switches and By-pass/Isolation Switch
UFGS 28 10 05	Electronic Security Systems (ESS)

D50 1.3 QUALITY ASSURANCE

Submit Qualifications, Certifications, and Test Plans indicated herein 45 calendar days prior to the expected date of execution. Notify the Contracting Officer 14 calendar days prior to all testing. Submit test results within 7 calendar days of completion of testing.

The Designer of Record is responsible for approving the submittals listed below.

D50 1.3.1 Qualified Testing Organization

Engage the services of a qualified testing organization to provide inspection, testing, calibration, and adjustment of the electrical distribution system and equipment listed in paragraph entitled "Acceptance Tests and Inspections" herein. Organization must be independent of the supplier, manufacturer, and installer of the equipment. The organization must be a first tier subcontractor.

Submit name and qualifications of organization. Organization must have been regularly engaged in the testing of electrical materials, devices, installations, and systems for a minimum of 5 years. The organization must have a calibration program, and test instruments used must be calibrated in accordance with NETA ATS.

Submit name and qualifications of the lead engineering technician performing the required testing services. Include a list of three comparable jobs performed by the technician with specific names and telephone numbers for reference. Testing, inspection, calibration, and adjustments must be performed by an engineering technician, certified by NETA or the National Institute for Certification in Engineering Technologies (NICET) with a minimum of 5 years' experience inspecting, testing, and calibrating electrical distribution and generation equipment, systems, and devices.

D50 1.3.2 NEC Qualified Worker

Provide in accordance with NFPA 70. Qualified Workers are allowed to be assisted by helpers on a 1 to 1 ratio, provided such helpers are registered in recognized apprenticeship programs. Submit a certification confirming NEC Qualified Worker requirements.

D50 1.3.3 Qualified PV Installer

Installation of photovoltaic (PV) systems must be performed by experienced and trained installers. At minimum the PV installation supervisor must hold a "PV Installer Certification" as issued by the North American Board of Certified Energy Practitioners (NABCEP) and hold a Certified Solar Roofing Professional (CSRP) credential issued by RISE "Roof Integrated Solar Energy Inc".

D50 1.3.4 Qualified Telecommunications Worker

All installers assigned to the installation of telecommunications systems or any of its components must be Building Industry Consulting Services International (BICSI) Registered Cabling Installation Technicians or have a minimum of 3 years experience in the installation of the specified copper and fiber optic cable and components. Include names and locations of two projects successfully completed using optical fiber and copper communications cabling systems. Include written certification from users that systems have performed satisfactorily for not less than 18 months. Include specific experience in installing and testing structured telecommunications distribution systems using optical fiber and Category 5e cabling systems.

D50 1.3.5 Material Standards

Ensure service support and provide manufacturer's nameplate in accordance with PTS Section Z10, *General Performance Technical Specification*.

D50 1.3.5.1 Warning Labels

Provide arc flash warning labels in accordance with UFC 3-560-01, *Electrical Safety, O & M*.

D50 1.3.5.2 Field-Required Nameplates

Provide laminated plastic nameplates for each switchboard, switchgear, panelboard, equipment enclosure, motor controller, relay, and switch. Each nameplate must identify the function and, when applicable, the position. Provide melamine plastic nameplates, 0.125 inch (3 mm) thick, white with black center core. Surface to be matte finish with square corners. Accurately align lettering and engrave into the core. Minimum size of nameplates is 1-inch by 2-1/2 inches (25 mm by 65 mm). Minimum size of lettering is 0.25 inch (6.35 mm) high normal block style.

D50 1.3.6 Factory Testing

The Government reserves the right to witness all factory testing. The manufacturer must have a calibration program that assures that all test instruments are maintained within rated accuracy.

D50 1.3.7 Electrical System Startup and Testing

Submit test plans for approval. Tailor test plans to the systems provided.

As part of the test plan, list make and model and provide functional description of the test instruments and accessories and describe the setup of the tests to be conducted. Test instruments must be capable of measuring and recording or displaying test data at a higher resolution and greater accuracy than specified for the equipment's performance.

D50 1.3.7.1 Factory Trained Engineer

Provide a factory trained engineer to supervise start-up and testing as required in referenced specifications.

D50 1.3.7.2 Performance Verification Testing

Perform in-service demonstration that all circuits and devices are in operating condition. Tests must confirm that each item of control equipment will function not less than five times. Provide all necessary test equipment, tools, fuel, load banks, labor, and materials for testing. As a minimum, test all systems in accordance with manufacturer's recommendations. Additional testing requirements for the various systems are described with those systems, hereinafter. Assure that all applicable test instruments are maintained within rated accuracy. Dated calibration labels are to be visible on all test equipment.

Submit a separate electrical field test plan in accordance with manufacturer's recommendations and that conforms to NETA ATS for each piece of Electrical Distribution Equipment and System requiring Performance Verification Testing.

The following items identify specific test requirements. Additional test requirements are contained in the applicable UFGS.

a. Panelboards - Field test each GFI and AFI circuit breaker with a UL 1436-certified outlet circuit tester to verify correct operation.
b. Motor control centers – Test motor starters in accordance with NETA ATS.
c. Surge Protective Devices (SPD) -

1) Inspect for physical damage and compare nameplate data with the drawings and specifications, if applicable. Verify from the nameplate data that the SPD equipment is appropriate for the system voltage.

2) Verify lead length between the SPD equipment and the

circuit connection is less than one foot.

3) Verify wiring between the SPD equipment and the circuit connection does not include high-inductance coils or sharp bends.

4) Confirm circuit breaker used for SPD circuit connection is sized in accordance with SPD manufacturer's requirements.

5) Ensure SPD equipment is grounded in accordance with SPD manufacturer's requirements. Check the ground lead on each device for individual attachment to the ground bus or electrode.

6) Check tightness of connections in accordance with NETA ATS.

7) For SPD equipment with visual indications of proper operation, verify that it displays normal operating characteristics.

d. Receptacles – Test GFI receptacles with a UL 1436-certified outlet circuit tester to verify correct operation.

e. Lighting - Aim photocell switches and locate light level sensors in accordance with the manufacturer's recommendations. Verify that equipment operates in accordance with user's requirements and in accordance with manufacturer’s recommendations. Fluorescent lamps on electronic dimming ballast control must be burned in at full light output for 100 hours before dimming.

f. Telecommunication - Test telecommunications systems in accordance with applicable EIA/TIA requirements.

g. Community Antenna Television Systems - Confirm design and installation is in compliance with NCTA-02, 47 CFR 76.605 and in accordance with FCC proof of performance requirements. Test plan must ensure that the system meets technical, operational, and performance specifications. Test plan must include testing for signal leakage.

h. Grounding systems - Test the grounding system in accordance with NETA ATS.

i. Lightning protection - Upon completion of the installation, furnish the UL Lightning Protection Inspection Certificate certified to NFPA 780 for the system.

j. Emergency lighting - Test emergency lighting that is intended for means of egress in accordance with NFPA 101, Section 5-9. Confirm the emergency lighting system operates for a minimum of 90 minutes and emergency illumination satisfies NFPA 101, Section 5-9, specified levels.

k. Building Integrated or Mounted Photovoltaic System (BIMPV) - Start up report including system performance. Compare system performance to expected performance and include at a minimum solar irradiance, DC energy, AC energy, ambient air temperature and PV cell temperature. Measure and report system performance for at least one

full day. If the performance monitoring of the installed array indicates the array is not meeting its required performance predictions it must be corrected at the Contractor's expense. Following correction, performance monitoring must again be performed until the array meets required performance predictions. Measurements made under actual installation and temperature must be normalized to Standard Test Conditions (STC).

D50 1.3.7.3 Acceptance Tests and Inspections

The Government reserves the right to witness all Acceptance Tests and Inspections, review data, and request other such additional inspections and repeat tests as necessary to ensure that the system and provided services conform to the stated requirements.

The Qualified Testing Organization must provide the Acceptance Tests and Inspections test plan and perform the acceptance tests and inspections. Test methods, procedures, and test values must be performed and evaluated in accordance with NETA ATS, the manufacturer's recommendations, and paragraph entitled "Field Quality Control" of each applicable specification section. Tests identified as optional in NETA ATS are not required unless otherwise specified. Place equipment in service only after completion of required tests and evaluations of the test results have been completed. Contractor must supply to the testing organization complete sets of shop drawings, settings of adjustable devices, and other information necessary for an accurate test and inspection of the system prior to the performance of any final testing. Perform acceptance tests and inspections on Diesel-Electric Generators, Uninterruptible Power Supply (UPS) Systems, 400-Hertz Motor Generator Sets, 400-Hertz Solid State Frequency Converters, Automatic Transfer Switches, and Switchboards and Switchgear.

D50 1.4 DESIGN SUBMITTALS

Submit design submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, FC 1-300-09N, *Navy and Marine Corps Design Procedures*, and UFC 3-501-01, *Electrical Engineering*.

In addition, UFGS sections listed below or in the body of the PTS text are to be used by the Designer of Record (DOR) as a part of the design submittal. If the UFGS products or systems are applicable to the project, the DOR shall edit these referenced UFGS sections and submit them as a part of the design submittal specification. Edit the specification sections in accordance with the limitations stated in PTS Section Z10, *General Performance Technical Specifications*.

UFGS 26 23 00, *Low-Voltage Switchgear*

UFGS 26 24 13, *Switchboards*

UFGS 26 29 23, *Adjustable Speed Drive (ASD) Systems Under 600 Volts*

UFGS 26 31 00, *Facility-Scale Solar Photovoltaic (PV) Systems*

UFGS 26 33 53, *Static Uninterruptible Power Supply (UPS)*

UFGS 28 10 05, *Electronic Security Systems (ESS)*

D50 1.4.1 Sustainable Design Submittal

Submit sustainable design submittals in accordance with Part 2 Section 01 33 29, *Sustainability Requirements and Reporting*.

D50 1.5 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*. In addition to the PTS Section Z10 requirements, the Designer of Record (DOR) must approve the following construction submittals as a minimum:

Electrical Equipment, OMSI information for equipment, and Quality Assurance Submittals listed above.

Provide certification that all adjustable protective device settings have been set in accordance with the coordination study for the as-built equipment and configuration.

D50 1.5.1 Sustainable Construction Submittal

Submit sustainable construction submittals in accordance with Part 2 Section 01 33 29, *Sustainability Requirements and Reporting*.

D5010 ELECTRICAL SERVICE AND DISTRIBUTION

D501001 MAIN TRANSFORMERS

Provide pad mounted distribution transformers in accordance with PTS Section G40, *Site Electrical Utilities*.

D501002 SERVICE ENTRANCE EQUIPMENT

When a switchboard is required, the Designer of Record must utilize UFGS Section 26 24 13 for the project specification, and submit the edited specification section as a part of the design submittal for the project.

When low voltage switchgear is required, the Designer of Record must utilize UFGS Section 26 23 00 for the project specification, and submit the edited specification section as a part of the design submittal for the project.

When digital metering is required for connection to the Direct Digital Controls (DDC) system, the Designer of Record must utilize UFGS Section 26 24 13 to specify the digital metering requirements and submit the edited specification section as a part of the design submittal for the project.

D501003 INTERIOR DISTRIBUTION TRANSFORMERS

D501004 PANELBOARDS

Provide panelboards that comply with UL 67 and UL 50. UL 869A applies if used as service entrance equipment. Panelboards for non-linear loads must be UL listed, including heat rise tested, in accordance with UL 67, except with the neutral assembly installed and carrying 200 percent of the phase bus current during testing.

Provide molded case circuit breakers in accordance with UL 489. Ground fault circuit interrupting circuit breakers must comply with UL 943. Arc fault circuit breakers must comply with UL 489 and UL 1699.

D501005 ENCLOSED CIRCUIT BREAKERS

Provide molded case circuit breakers in accordance with UL 489. UL 869A applies if used as service entrance equipment. Provide with solid neutral when grounded conductor is present.

D501006 MOTOR CONTROL CENTERS

Provide motor control centers that comply with UL 845, NEMA ICS 2, and NEMA ICS 3. Motor controllers must comply with UL 508. Provide disconnecting means capable of being locked out for machines and other equipment to prevent unexpected startup or release of stored energy in accordance with 29 CFR 1910.147.

D501006 1.1 VARIABLE FREQUENCY DRIVES (VFD)

When Variable Frequency Drives are required, the Designer of Record must utilize UFGS Section 26 29 23 for the project specification, and submit the edited specification section as a part of the design submittal for the project.

D501090 OTHER SERVICE AND DISTRIBUTION

D501090 1.1 SURGE PROTECTIVE DEVICE (SPD)

D5020 LIGHTING AND BRANCH WIRING

D502001 BRANCH WIRING

Provide wiring and connections for special outlets where required.

All homerun circuits must contain no more than 3 phase conductors.

Provide switches that comply with NEMA WD-1 and UL 20.

D502002 LIGHTING EQUIPMENT

Install in accordance with manufacturer's recommendations and the additional requirements for "Severe Seismic Disturbance" contained in ASTM E 580. Fixture support wires must conform with ASTM A 641/A 641M, galvanized regular coating, soft temper.

D502002 1.1 BALLASTS

Electronic ballasts must include a 5-year warranty.

D5030 COMMUNICATIONS AND SECURITY

D503001 TELECOMMUNICATIONS SYSTEMS

Refer to Part 3 and UFC 3-501-01.

D503002 PUBLIC ADDRESS SYSTEMS

Refer to Part 3 and UFC 3-501-01.

D503003 INTERCOMMUNICATIONS SYSTEMS

Refer to Part 3 and UFC 3-501-01.

D503004 TELEVISION SYSTEMS

D503004 1.1 CLOSED CIRCUIT TELEVISION (CCTV) FOR VIDEO TRAINING

D503004 1.2 COMMUNITY ANTENNA SYSTEM (CATV)

D503005 SECURITY SYSTEMS

D503005 1.1 ELECTRONIC SECURITY SYSTEMS (ESS)

When an ESS system is required, the Designer of Record must utilize UFGS Section 28 10 05, *Electronic Security Systems (ESS)*, for the project specification and submit the edited specification section as a part of the design submittal for the project.

D503005 1.2 PROTECTED DISTRIBUTION SYSTEMS (PDS)

Provide Protected Distribution Systems in accordance with UFC 3-580-10 and IA PUB-5239-22, Information Assurance Protected Distribution System (PDS) Guide Book.

D503005 1.3 SENSITIVE COMPARTMENTED INFORMATION FACILITIES (SCIF)

Electrical systems installed within SCIF spaces or facilities must comply with ICD 705, ICS 705-1, ICS 705-2, and with IC Tech Spec for ICD/ICS 705.

D503006 INDUSTRIAL CONTROL SYSTEMS (ICS)

D503090 OTHER COMMUNICATIONS AND ALARM SYSTEMS

D5090 OTHER ELECTRICAL SERVICES

D509001 GENERAL CONSTRUCTION ITEMS (ELECTRICAL)

Refer to Part 3 and UFC 3-501-01.

D509002 EMERGENCY LIGHTING

D509002 1.1 EMERGENCY LIGHTING

D509003 GROUNDING SYSTEMS

Refer to Part 3 and UFC 3-501-01.

D509004 LIGHTNING PROTECTION

When a lightning protection system is required the designer of record must utilize UFGS section 26 41 00 and submit the edited specification section as a part of the design submittal for the project.

D509005 ELECTRIC HEATING

D509006 ENERGY MANAGEMENT CONTROL SYSTEM

D509007 PHOTOVOLTAIC ENERGY SYSTEM

When a photovoltaic system is required, provide a grid tied photovoltaic energy system including roof mounted crystalline photovoltaic panels, combiner boxes, inverters, and support system. The Designer of Record must utilize UFGS Section 26 31 00 for the project specification, and submit the edited specification section as a part of the design submittal for the project.

D509007 1.1 CODES AND STANDARDS

The PV system hardware and services must meet or exceed all applicable local, State and utility requirements, conform to the applicable codes and standards, and have passed the listing and qualification tests, listed below. (Comply with the most recent version of each document).

a. IEEE 1262 "Recommended Practice for Qualification of Photovoltaic Modules".
b. PowerMark certification for PV modules.
c. IEEE Standard 928-1986, Recommended Criteria for Terrestrial Photovoltaic Power Systems (PV system performance criteria).
d. IEEE 1547 Standard for Interconnecting Distributed Resources with Electric Power Systems.
e. Underwriters Laboratories 1741 (UL Standard for Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources).
f. Underwriters Laboratories 1703 (UL Standard for Listing Photovoltaic Modules).
g. Certification of PV Equipment: All PV modules, inverters, and electrical components must be listed or recognized by an appropriate and recognized United States Safety Laboratory (for example: UL or ETL).

D509007 1.2 PHOTOVOLTAIC ROOFTOP APPLICATION ANALYSIS

Provide a comprehensive "Photovoltaic Application Analysis" with a detailed description of system, application, site shading conditions and expected kW output of the rooftop photovoltaic applications. Utilize the Solmetric Suneye or the Solar Pathfinder shading analyzers to analyze the effects of the existing site shading conditions. Analysis must include estimated PV output in kWh per year. Coordinate rooftop application analysis with other equipment that is required to be placed on the roof to determine space

available and proper solar orientation for photovoltaic equipment.

D509007 1.3 TECHNICAL REQUIREMENTS

The Contractor work responsibilities include at a minimum: system design, equipment selection, and PV system installations. System must be individually capable of providing peak power output of at least proposed PV system size, 208 or 480 volt, 3-phase, 4-wire power.

Configure system to allow automatic operation without operator intervention. Design system and specify equipment to minimize maintenance requirements. System must include metering incorporated with current AMI network (Advanced Metering Infrastructure) and planned energy metering projects.

Locate the inverter(s) disconnects and associated electrical equipment in an area that is accessible, weather-protected, and secure from vandalism and personal injury.

Mount disconnects and over current devices in approved boxes, enclosures, or panel boards. Disconnects and switches must be DC rated when used in DC applications. Bond metal enclosures and boxes to the grounding conductor.

At a minimum, electrical meters must capture the following data on individual system performance (minimum solar irradiance, DC power, AC real power, AC current, AC voltage, and power factor (recommend ION 8600 for AC); ambient air temperature, PV cell temperature, kW, and kWh). This data must be captured at hourly intervals for a minimum one year. Units of temperature, power, and current are to be in Fahrenheit, Watts, and Amps respectively.

Transformers, if required, must have a minimum efficiency based on factory test results of not less than the efficiency indicated in 10 CFR 431, Subpart K, paragraph 431.196(b). Transformers must be housed in NEMA 4X enclosures.

Layout of modules on roof must meet the requirements of NFPA-1 including labeling, roof access, and roof pathways. Coordinate roof venting requirements with fire protection engineer.

Mounting structures must be corrosion resistant to marine environment.

Provide permanent plaque or directory at each building service and power source identifying all other building services and power sources.

Refer to RFP Part 4, PTS B30 *Roofing*for additional layout and installation requirements.

D509007 1.4 OPERATORS MANUALS AND TRAINING

Operators manuals for each system component must include detailed instructions on how to operate the system, programming and installation instructions, emergency operating procedures, default program values and set points, listing of field programmed variables and set points, equipment wiring diagrams, product model number, with Name, Address and Telephone number of local representative, and starting, operating, and shut down procedures. Include normal and emergency shut down procedures, schedule of maintenance work, if any, recommended cleaning agents and methods,

replacement parts list, including internal fuses, and warranty information.

Provide a formal 2-hour on-site training session instructing operators in the operation and maintenance of the new system, including operation and maintenance of inverters, disconnects and other system components. Instruct personnel in removal and installation of panels, including wiring and all connections. At the time of training furnish, for the equipment specified, operation and maintenance manuals, record drawings and recommended spare parts lists identifying components adequate for competitive supply procurement for operation and maintenance of system.

D509007 1.5 FIELD QUALITY CONTROL

Schedule connection of the photovoltaic system with the Contracting Officer such that the Contracting Officer can be present when the photovoltaic system is tied to the grid.

Provide test plan that meets the requirements of IEC 62446. Test plan must include expected values for testing. Provide test results.

Tests must include the following:

a. Verify that non-current carrying metal parts are grounded.
b. Verify that all components are labeled.
c. Verify mounting supports are installed properly, and all fasteners are installed correctly and torqued to manufacturer's instructions.
d. Test open circuit voltage of each string in full sunlight.
e. Test output of inverter. Measure solar irradiance. Perform calculations to show inverter output is consistent with the expected performance.

SECTION E10

EQUIPMENT
09/22

E10 GENERAL

RFP Part 3 including the Engineering System Requirements (ESR) provide project specific requirements. The RFP Part 4, Performance Technical Sections (PTS) provide generalized technical requirements that apply to multiple facility types and include more requirements than are applicable to any one project. Therefore, only the RFP Part 4 requirements that apply to the project and further define the RFP Part 3 project specific requirements are required.

E10 1.1 GENERAL REQUIREMENTS

Where required by the project program, obtain the services of equipment specialists to specify any audiovisual, shop, fitness equipment, or other specialty equipment. Equipment specialists must not have any affiliation with the product specified. All specialty equipment must be installed by qualified installers regularly engaged in installing the specialty equipment. Systems furnishings installers must be the systems furniture manufacturer's dealer of record.

E10 1.2 DESIGN GUIDANCE

Provide the design and installation in accordance with the following references. This Performance Technical Specification (PTS) adds clarification to the fundamental requirements contained in the following Government Standards. The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification*.

Industry standards, codes, and Government standards that are referenced in the section text that are not found in the Unified Master Reference List (UMRL) in the Federal Facility Criteria (FFC) at the Whole Building Design Guide (WBDG) website, are listed below for basic designation identification. Comply with the required and advisory portions of the current edition of the standard at the time of contract award.

E10 1.2.1 Industry Standards and Codes

Loading Dock Equipment Manufacturers' Association (LODEM)

E10 1.2.2 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s):UFC 3-101-01, ArchitectureUFC 3-120-10, Interior Design)

E10 1.3 PERFORMANCE VERIFICATION AND COMPLIANCE TESTING

Provide verification of satisfactory special equipment and furnishing systems performance via Performance Verification Testing, as detailed in this section of the RFP.

E10 1.3.1 Field Tests for Dock Leveling Equipment

a. Roll-over Tests - Move roll-over load of 20,000 pounds (9,072 kg) over the dock leveler between the bed of a freight carrier and the building loading dock surface for ten cycles. With the ramp extension retracted and the ramp platform leveled with the building loading dock surface, run a 20,000 pound (9,072 kg) roll-over load over the ramp in various directions for 20 cycles. No permanent deformation or hydraulic fluid leakage must occur subsequent to examination after these tests.

b. Drop Tests - Twice, drop test the dock leveler at the indicated rated capacity as follows: With the load on the platform and the load resting on a vehicle carrier bed not less than 10 inches (254 mm) above loading dock surface, pull the carrier or pull away from the lip, leaving the loading ramp unsupported. The measured vertical drop of the dock leveler taken at the point where the lip rests on the vehicle carrier must not exceed 4 inches (102 mm) during each of the drop tests. Inspect the loading ramp after each drop and ensure no damage or distortion to the mechanical, electrical, or structural components. There must be no leakage from the hydraulic system.

c. Acceptance Tests - Perform an acceptance test in the presence of the dock leveler manufacturer and the Contracting Officer subsequent to the roll-over load and drop tests. Conduct operation of the equipment through all of its motions and specified checks as follows: (a) extend lip to rest on a variety of freight carriers with beds up to 12 inches (305 mm) above and below deck level; (b) test 102 mm (4 inches) drop limitation with 7,000 pound (3,175 kg) load on ramp, evenly distributed; (c)test level compensation with the ramp, loaded with a minimum of 7,000 pounds (3,175 kg); and (d) test proper compensation (float) for various compression of counter-springs, with ramp loaded and unloaded.

E10 1.4 DESIGN SUBMITTALS

Provide design submittals in accordance with Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, Facilities Criteria (FC) 1-300-09N, *Navy and Marine Corps Design Procedures*, UFC 3-101-01, *Architecture*, and UFC 3-120-10, *Interior Design*.

E10 1.5 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with PTS Section Z10, *General*

Performance Technical Specifications. In addition to the Z10 requirements, the Designer of Record (DOR) must approve the following construction submittals as a minimum:

Field tests of equipment, vault door, loading dock equipment, kitchen equipment and unit kitchens.

Energy efficiency ratings for food service equipment, as applicable.

E1010 COMMERCIAL EQUIPMENT

E101005 SECURITY & VAULT EQUIPMENT

E101005 1.1 VAULT AND DOORS

Design the Vault ("Weapons Storage Area" (WSA) or "Armory", or other title according to the project program) space in accordance with criteria in Military Handbook (MIL-HDBK) 1013/1A to provide at least 10 minutes of delay time against low and medium threat severity levels of forced entry. The space is required to be built to the construction standards described in MIL-HDBK-1013/1A for Class A vaults. The reinforced concrete must have minimum 28-day compressive strength of at least 3000 PSI (20,684 kPa) and the floor, walls, and ceiling/roof components of this space must all be cast in place and at least 8 inches (200 mm) thick. The door into the vault must be a General Services Administration (GSA)-Approved and labeled Class 5 Security Vault Door that conforms to Federal Specification AA-D-00600. Provide door manufacturer's modified standard or custom Day Gate, designed for use with the vault door furnished, for access control and weapons issue. Except for the door opening, penetrations and openings through the structural "security" envelope of the floor, walls, and ceiling/roof of the Vault that are 96 sq. inches (618 sq. cm) or greater with the least dimension greater than 6 inches (150 mm) are not allowed. PTS Section D50, *Electrical*, includes requirements for Intrusion Detection System (IDS) within the space and for Security Lighting at the outside of the Vault Door to the space.

E101005 1.1.1 Set-backs

Where the perimeter walls of the WSA spaces are part of the facility exterior walls, the vault walls must be set back from the exterior part of the exterior wall to allow at least 4 inches (100 mm) for the normal wall facing to cover the vault walls.

E101005 1.1.2 Egress

Where a WSA space exceeds 1000 square feet (90 sq m) in floor area, or will have more than eight occupants, the space must have a minimum of 2 exits for safety purposes. When more than one entrance / exit is required, each must be equipped with a Security Vault Door, with only one used for normal entry access.

E101005 1.2 SECURITY VAULT DOOR

Security Vault Door must be GSA-Approved and labeled Class 5 Security Vault Door that conforms to Federal Specification AA-D-00600. Provide GSA-Approved and labeled Class 5 Security Vault Door that conforms to Federal Specification AA-D-00600. Door(s) for normal or special entry access must

be Class 5, either Type IIR- right opening swing without optical device or Type IIL- left opening swing without optical device as determined by design arrangement, Style K- Key change combination lock, Design S- single lock.

Where a second or additional door is required for safety purposes, door(s) for exit only must be Class 5, either Type IR- right opening swing with optical device or Type IL- left opening swing with optical device as determined by design arrangement, Style K- Key change combination lock, Design B- no exterior hardware.

E101005 1.3 DAY GATE

Provide vault door manufacturer's modified standard or custom day gate designed for use with vault door furnished, for access control and weapons issue. Day gate construction must be minimum 10 gage (3.4 mm) steel flattened and expanded metal welded to a 1 inch (25 mm) minimum steel channel or angle welded frame; expanded metal pattern must be 1 inch by 1-3/4 inch (25 by 45 mm) diamond grid. Maximum clearance between sides, top and bottom of the day gate and the vault door-frame and floor must be 1 inch (25 mm) when the day gate is closed. Provide gate hinged on same side as the vault door, swinging to 180 degrees into the vault from closed to open positions. Provide day gate with locking device operable from both sides; the outside by key and the inside by key, knob, lever, or deadbolt; the inside locking device must either be positioned so that it is not accessible from the outside or it must be operable by key only. Day gate must include an issue port opening, cover with locking mechanism, and shelf. The issue port must be a framed opening welded to the day gate frame with a hinged door cover. The hinged door must be minimum 18 gage (1.2 mm) steel and must be lockable from the inside only. The opening must be 8 inches (200 mm) high and 12 inches (300 mm) wide; tolerances are plus or minus 0.125 inch (3.2 mm). When the issue port is closed, the hinged door cover must match the opening to within 0.0625 inch (1.6 mm). The shelf must be minimum 16 gage (1.5 mm) stainless steel, 12 inches (300 mm) deep by 12 inches (300 mm) wide to match the port opening, and must be capable of withstanding a vertical force of 100 lbf (445 N) at any point without deformation. Provide the manufacturer’s standard painted finish to match that of the vault door. The day gate must not interfere with the operation of vault door inner escape device.

E1020 INSTITUTIONAL EQUIPMENT

Institutional equipment includes items that are normally found in hospitals, laboratories, auditoriums, and libraries.

E102001 MISCELLANEOUS COMMON FIXED & MOVABLE EQUIPMENT

This section must include fixed workbenches, hazardous and non-hazardous shop materials cabinetry, shop tools, and other fixed and movable equipment.

E102009 AUDIO-VISUAL EQUIPMENT

E102009 1.1 CEILING MOUNT FOR PROJECTOR

Provide the ceiling mounted hardware for a digital projector, to be coordinated with support blocking (see PTS Section C10, *Interior Construction*) and electrical and data connections (see Section D50, *Electrical*).

E1030 VEHICULAR EQUIPMENT

E103002 LOADING DOCK EQUIPMENT

This paragraph covers the requirements for dock bumpers, truck-trailer restraining devices, and industrial, mechanical and electro-hydraulic dock levelers of a fixed hinged type. All loading dock equipment must be Navy certified.

Provide a Loading Dock Equipment System for the protection of service docks and for the loading and unloading of service vehicles.

E103002 1.1 DOCK LEVELERS

Based on the performance requirements of the project program, provide American National Standards Institute (ANSI) MH30.2 (see LOEDM) steel tread plate lip and platform, hinged and supported from beneath by steel framework that contains lifting, positioning, and lowering assembly. The design must permit washing with water and detergents, and operation in an ambient temperature from 0 degrees F to plus 110 degrees F (−18 degrees C to plus 43 degrees C). Minimum roll over capacity must not be less than 20,000 pounds (9,072 kg).

E103002 1.1.1 Height Adjustment

Provide a ramp with a minimum incline adjustment of 24 inches (600 mm). Divide 12 inches (300 mm) above and 12 inches (300 mm) below the platform height.

E103002 1.1.2 Loading Ramp Compensation

a. Freight Carrier Out of Level - Allow a minimum correction of one inch for each 18 inches (450 mm) and maximum of 4-inch (100 mm) correction of ramp width over the width of the ramp.
b. Loading and Unloading of the Freight Carrier - When the lip is extended, provide a 4-inch (100 mm) compensation for carrier spring deflection to allow full contact between the lip and the carrier bed.

E103002 1.1.3 Safety Devices

a. Electro-hydraulic System - Provide a device to automatically prevent a drop of more than 4 inches (100 mm) of the lip should the freight carrier move away from the dock leaving the lip unsupported.
b. Mechanical System - Provide a three-position safety system to limit platform fall to dock level and 4 and 8 inches (100 and 200 mm) below dock level.
c. Dock Bumpers - Provide laminated rubber, tire fabric or equivalent dock bumpers along the length of the loading dock.

E103002 1.1.4 Operation

a. Mechanical Control - Mechanical chain activated, with extension-spring operation and counter-balance non-manual, raising and lowering system.
b. Electro-Hydraulic Control - Provide dock leveler with

pushbutton control, heavy-duty dust tight and oil tight rated in accordance with National Electrical Manufacturers Association (NEMA) ICS 2, Part ICS2-216 for alternating current.

c. Construction and Materials - The entire live load carrying surface of the ramp and rear attachment must not be less than 1/4-inch(6 mm) thick, 55,000 PSI (379,200 kPa) minimum yield strength, low alloy, non-skid steel tread plate.

d. Toe Guards - Provide sides or edges of the ramps which rise above the surrounding loading dock with sheet carbon steel skirts or toe guards of minimum 14 gage nominal thickness.

E103002 1.1.5 Electro-Hydraulic Lift System

Provide a complete and separate system for each dock leveler. Design system to withstand not less than 150 percent of the design operating pressure. Provide hose, fittings, pipe and tubing with working pressures based upon a minimum 4 to 1 safety factor of bursting pressure.

E103002 1.1.6 Electrical Requirements

National Fire Protection Association (NFPA) 70, NEMA ICS 2, NEMA ICS 6 and NEMA MG 1

a. Motor - Conform to NEMA MG 1 and continuous duty or 60-minute time rated, industrial type, single speed rated for operating conditions.

b. Control - NEMA ICS 2, size 0 controller for heavy industrial service.

c. Transformer - Totally enclosed, self-cooled, dry type transformer. Incorporate circuit breakers with ground fault interrupting protection conforming to Underwriters Laboratories (UL) 943.

E103002 1.1.7 Structural Warranty

Present a manufacturer's warranty certifying the leveler against operational malfunction or structural failure, or both, for a period of 10 years from the date of acceptance by the Government. Warranty may exclude failure through overloading evidenced by member breakage or residual deformation; but it must not exclude breakage of welds or fastenings, fatigue breakage of components, or wear of moving parts. Provide warranty to cover the full costs of repairs, or replacements in case of a nonrepairable failure.

E103002 1.1.8 Accessories

a. Dock Truck or Trailer Restraining Device - Provide self-aligning device, with a positive restraining force of not less than 18,000 pounds (8,165 kilograms). Device must service all truck or trailers with Interstate Commerce Commission (ICC) bars located between 12 and 30 inches (300 and 750 mm) above ground level.

E103003 WAREHOUSE EQUIPMENT

This paragraph covers the requirements for storage racks, heavy duty shelving, material handling conveyors, and other warehouse equipment. See the project program.

E103004 AUTOMOTIVE SHOP EQUIPMENT

This paragraph covers the requirements for automotive vehicle lifts meeting the requirements of ANSI/ALI ALCTV-1998 standards, and other automotive shop equipment such as pneumatic liquids delivery systems. See the project program.

E1040 GOVERNMENT FURNISHED EQUIPMENT

Refer to the project program.

E1090 OTHER EQUIPMENT

E109002 FOOD SERVICE EQUIPMENT

Provide Food Service Equipment and the kitchen design in accordance with FC 4-722-01N, *Navy and Marine CorpsDining Facilities*. This paragraph covers the items of commercial food service equipment. Included are items used for liquid and solid food storage, food preparation, cooking, display, serving, and clean up equipment. Provide 180 degree F (82 degree C) hot water or chemical treatment for sinks, dishwashers, pot washers, and exhaust ventilator wash down systems.

Provide products that meet or exceed the specified energy efficiency requirements of FEMP designated or Energy Star qualified products. Submit documentation certifying that products conform to Public Law 109-58 by meeting or exceeding Energy Star or FEMP efficiency requirements as defined at "Energy-Efficient Products" at http://femp.energy.gov/procurement . Indicate the Energy Efficiency Rating.

E109002 1.1 COMMERCIAL FOOD SERVICE EQUIPMENT

E109002 1.1.1 Equipment Materials

Fabricate custom and commercial equipment in accordance with NSP 2.

a. Stainless Steel Sheets - American Society for Testing and Materials (ASTM) A167, 18-8 Composition, Type 302 or 304 or 316, non-magnetic, with a No. 4 finish on the exposed face.
b. Tubing - ASTM A 270
c. Framing and Cross Bracing - ASTM A 276, Type 302 or Type 304 or Type 316
d. Copper Tubing –

1) Tube - ASTM B 88, Type K, annealed, for buried or embedment in concrete, and Type L, hard drawn, for above grade installation.

2) Fittings - ANSI B16.18, above grade, American Society of Mechanical Engineers (ASME) B16.22 or ASME B16.26, above or below grade.

e. Welded Joints - Use tungsten inert gas process. Use filler metal compatible with the material being welded. Make all visible

welds ductile and of same color as adjoining surfaces. Coat welds in hidden areas that are not finished by grinding and polishing and the accompanying discoloration in the factory with a metallic-based paint to prevent progressive corrosion. Grind exposed welded joints flush with the adjoining material and finish and polish to match the adjoining surface. Grind off excess metal and smooth to a No. 4 finish. Remove imperfections such as pits, runs, sputter, cracks, low spots, voids and buckle.

Penetrate entire thickness for the entire length of the joint; make joints flat, continuous and homogeneous with the sheet metal without reliance on straps under seams or spot welding. When stainless steel is joined to dissimilar metals, use stainless steel for fastening devices and welding material.

f. Solder - ASTM B 32, 95.5 tin-antimony solder or other lead-free solder for contact with potable water or food. Provide ASTM B 32, alloy grade 50B for temperatures up to 150 degrees Fahrenheit (65 degrees Celsius).

E109002 1.1.2 Custom-Fabricated Counters, Dishwasher Counters, and Sinks

Fabricate of 14 gage (1.8 mm) stainless steel, with all shop seams and water tight welded corners ground smooth, and polished. Pitch all flat surfaces to drain and eliminate any chance of standing water. Counters and sinks must be furnished complete with integral stainless steel backsplashes, side splashes, and legs with adjustable feet.

a. Sinks - Provide integral sinks in accordance with the requirements of NSF 2, and ASTM A112.19.3M. Provide minimum of 0.75 inch (19 mm) radius on all corners.

E109002 1.1.3 Exhaust Ventilators

Exhaust ventilators must conform to NFPA 96, UL 710, and SMACNA DCS. Fabricate exhaust ventilators of minimum 18 gage stainless steel in segments not longer than 12'-0". Provide centrifugal grease-extracting design to remove 95% of matter from the air with non-removable extracting baffles located in the plenum chamber. Exhaust ventilators must provide integral make-up air system in accordance with NFPA 96. Provide automatic wash-down cycle and fan control on adjacent wall.

a. Fire Damper - Provide mechanically driven damper and damper control. Activate by heat-sensing thermostat set to react to a temperature of 350 degrees F (177 degrees C) in exhaust duct at exhaust ventilators.
b. Fire Protection System - Provide a pre-engineered wet system in accord with NFPA 96.

E109002 1.1.4 Pre-Fabricated Walk-in Refrigerators and Freezers

Provide walk-in units manufactured for food service use conforming to NSF 7, UL 207, and UL 471. Provide refrigeration unit complying with American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) 15. Outside compressors, if used,

require winter controls, housing, and crankcase heater. Provide monitoring system to alarm abnormally low or high temperatures, and personnel safety alarm. If the unit utilizes the floor of the facility as an interior surface of the unit, it must be insulated and separated from adjacent floors.

E109002 1.1.5 Food Waste Disposer - ASTM F917

E109002 1.1.6 Beverage Dispenser, Non-Carbonated, Refrigerated - ASTM F918

E109002 1.1.7 Food Slicing Machine - ASTM F919

E109002 1.1.8 Food Mixing Machine - ASTM F952

E109002 1.1.9 Powdered Iced Tea Dispenser - ASTM F1023

E109002 1.1.10 Frying and Braising Pan, Tilting - ASTM F1047

E109002 1.1.11 Food Cutter - ASTM F1126

E109002 1.1.12 Food Waste Pulper - ASTM F1150

E109002 1.1.13 Cooker, Steam - ASTM F1217

E109002 1.1.14 Ovens, Microwave - ASTM F1360

E109002 1.1.15 Vegetable Peeling Machine - ASTM F1371-04

E109002 1.1.16 Combination Oven - ASTM F1495

E109002 1.1.17 Food Processor - ASTM F1568

E109002 1.1.18 Kettle, Steam Jacketed (20-200 gal) Floor or Wall Mounted - ASTM F1602

E109002 1.1.19 Kettle, Steam Jacketed (32 oz-20 gal), Table Mounted - ASTM F1603

E109002 1.1.20 Freezer, Ice Cream, Soft Serve - ASTM F1604

E109002 1.1.21 Griddle, Single or Double Sided - ASTM F1919

E109002 1.1.22 Deep Fat Fryers - ASTM F1963

E109002 1.1.23 Dough Divider/Rounder - ASTM F1966

E109002 1.1.24 Dishwashing Machines

a. Hot Water Sanitizing Rack Type, ASTM F857
b. Hot Water Sanitizing Single Tank, ASTM F858
c. Hot Water Sanitizing, Multi-Tank, ASTM F859
d. Hot Water Sanitizing, Multi-Tank, Conveyor, ASTM F860
e. Chemical Sanitizing, Stationary Rack, ASTM F953
f. Chemical Sanitizing, Fresh Water Rinse, ASTM F1022
g. Hot Water Sanitizing, Oval Conveyor, Multi-tank, ASTM F1237

E109002 1.1.25 Pot and Pan Washing Machines

a. Heat Sanitizing, Oscillating Arm Type, ASTM F1202
b. Heat Sanitizing, Rotary Conveyor, ASTM 1203
c. Heat Sanitizing, Rack Type, Rotary Spray, ASTM F1114

E109002 1.2 RESIDENTIAL OR LIGHT COMMERCIAL ELECTRIC KITCHEN EQUIPMENT

E109002 1.2.1 Cooking Top

Conform to UL 197 and UL 858.

E109002 1.2.2 Freezer

UL 250, minimum 14 cubic feet (0.39 cubic meters), frost-free.

E109002 1.2.3 Refrigerator

UL 250, refrigerator with frost-proof freezer, minimum 14.6 cubic feet (0.41 cubic meters).

E109002 1.2.4 Freestanding Ice Maker

UL listed and NSF approved; self-contained, air-cooled model, minimum ice production of 355 pounds (161 kg) per 24 hours, and a minimum bin storage capacity of 180 pounds (82 kg) of ice cubes.

E109002 1.2.5 Griddle

UL 197 and NSF 2, built-in counter-top model. Minimum capacity must be 260 pancakes or 420 hamburgers 4 ounces (110 g) per hour.

E109002 1.2.6 Microwave Oven

UL 923, minimum 1 cubic foot (0.03 cubic meter) capacity.

E109002 1.2.7 Oven

UL 858, self-cleaning and built-in.

E109002 1.2.8 Trash Compactor

UL 1086, under-counter model with storage compartment and 20 gallon (75 liter) trash disposal bag capacity.

E109002 1.2.9 Kitchen Exhaust Hood

NFPA 96 and NSF 2, factory fabricated of minimum 18 gage stainless steel.

E109002 1.2.10 Range Hood

UL 858, vented or non-vented with two-speed fan.

E109002 1.2.11 Dishwasher

UL 921 or UL 749 with detergent dispenser. For heavy-duty dishwasher, provide stainless steel commercial grade with approximately 300-dish per hour and 540 glasses per hour ratings.

E109002 1.2.12 Residential Garbage Disposal

UL 430, stainless steel, continuous feed with minimum 1/2 or 3/4 hp motor. Optional 1 hp motor for heavy usage.

E109005 UNIT KITCHENS

E109005 1.1 UNIT KITCHENS

Provide complete unit kitchens with countertops, sinks, faucets, appliances, and accessories. Comply with DoD Architectural Barriers Act (ABA) Standards in units for the disabled. Provide high pressure laminate or natural wood finish.

E109005 1.2 UNIT KITCHEN COMPONENTS

a. Cabinets - American National Standards Institute/Kitchen Cabinet Manufacturers Association (ANSI/KCMA) A161.1 wood and plywood cabinetry with drainers and cabinet doors.

   1) Provide 3/4-inch (19 mm) solid wood for face framing, drawer fronts, and shelves up to 36 inch (91.44 cm) wide. Cabinet body members require spline, biscuit, dowel or dado joining.

   2) Provide 1/2-inch (12.8 mm) solid wood for drawer boxes with dovetail or dowelled joints.

   3) Provide 3/8-inch (9 mm) plywood for cabinet box and toe board.

   4) Provide cabinet doors of High Pressure Laminate covered medium density fiberboard or stile and rail doors.

b. Countertop - Provide ASTM 2124.3 and ASTM 2124.6, solid polymer countertop and 3-1/2 inch (89 mm) backsplash.

c. Sink and Faucet - Provide ANSI A112.18.1M, NSF International Standard 61 sink and faucet. Section 9 for sink and faucet. Provide large 22 gauge stainless steel sink with basket strainer in w with water stopper. Faucet must be a washerless cartridge system.

d. Refrigerator-Freezer – 5 cubic foot minimum undercounter refrigerator freezer. Provide interior light, defrost, adjustable shelving, adjustable thermostat features, and zero degree freezer.

e. Microwave Oven/Ventilation Hood Combination. Provide 1.4 cubic foot 900 watt minimum, microwave/hood above cooktop. Ductless hood must be convertible to ducted at the project site.

f. Cooktop – Provide drop-in 2 burner black ceramic cooktop with 1200 watt elements.

g. Dishwasher – Provide 24 inch wide Energy Star Large capacity dishwasher.

h. Accessories.

   1) Back wall shield and end wall shields when against an end wall.

2) Countertop fluorescent lighting.

3) Drawer slides rated for 100 pound capacity.

4) Door hinges to be adjustable, self-closing, and configured to allow screw application to cabinet door from two directions.

E109090 OTHER SPECIALIZED FIXED AND MOVABLE EQUIPMENT

Specialized fixed and moveable equipment not described by the other assembly categories.

E109090 1.1 WEAPONS RACKS

Weapons Storage Racks may be purchased or may be steel fabrications. Comply with OPNAVINST 5530.13c and standard operating procedure for the facility.

E109090 1.2 GEAR DRYING CAGES

Drying cages (racks) for SCUBA gear may be purchased or may be fabrications. Comply with standard operating procedures for the facility.

-- End of Section --

SECTION E20

FURNISHINGS
09/22

E20 GENERAL

RFP Part 3 including the Engineering System Requirements (ESR) provide project specific requirements. The RFP Part 4, Performance Technical Sections (PTS) provide generalized technical requirements that apply to multiple facility types and include more requirements than are applicable to any one project. Therefore, only the RFP Part 4 requirements that apply to the project and further define the RFP Part 3 project specific requirements are required.

E20 1.1 DESIGN GUIDANCE

Provide the design and installation in accordance with the following references. This Performance Technical Specification (PTS) adds clarification to the fundamental requirements contained in the following Government Standards. The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification*.

Industry standards, codes, and Government standards referenced in the section text that are not found in the Unified Master Reference List (UMRL) in the Federal Facility Criteria (FFC) at the Whole Building Design Guide (WBDG) website, are listed below for basic designation identification. Comply with the required and advisory portions of the current edition of the standard at the time of contract award:

E20 1.1.1 Industry Standards and Codes

E20 1.1.2 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s):UFC 3-101-01, ArchitectureUFC 3-120-10, Interior Design)
UFC 1-200-02	High Performance and Sustainable Building Requirements

E20 1.2 GENERAL REQUIREMENTS

Provide the services of an Interior Designer, certified by the National Council for Interior Design Qualification (NCIDQ), or a state and/or jurisdiction Certified, Registered, or Licensed Interior Designer prepare both the Furniture, Fixtures, & Equipment (FF&E) and the

Structural Interior Design (SID) Package, attend and participate, in entirety, all kick-off meetings, design meetings, to include, but not limited to, design charettes, concept design workshops, and review meetings to develop the building design, floor plan, and the FF&E package. Provide the services of equipment specialists to specify the audiovisual, shop, or specialty equipment. The Interior Designer and any specialists must not be affiliated with any furniture dealership/vendor or manufacturer. The Government Interior Designer reserves the right to approve/disapprove the qualifications of the Contractor's Interior Designer.

Systems furnishings installers must be the systems furniture manufacturer's approved dealer of record. In addition, installation dealers must be located within a 100 mile radius of the project site unless approved by the government Interior Designer.

[Re-purpose/ recycle existing furniture if not relocated by the government. Provide verification that the existing furniture was not disposed of at the landfill.]

E20 1.3 DESIGN SUBMITTALS

Provide design submittals in accordance with Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, Facilities Criteria (FC) 1-300-09N, *Navy and Marine Corps Design Procedures*, and UFC 3-120-10, *Interior Design*.

E20 1.4 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*. In addition to the Z10 requirements, the Designer of Record (DOR) must approve the following construction submittals as a minimum:

Art work and FF&E Package

E2010 FIXED FURNISHINGS

E201001 FIXED ARTWORK

E201002 WINDOW TREATMENTS

Provide interior window coverings, associated hardware and controls at each exterior window and at any interior view window where privacy may be required. Refer to the Project Program for size, pattern and style of window treatments. At a minimum, functional window coverings such as blinds or solar shades are required on all projects.

E201002 1.1 BLINDS

Venetian blinds must be one-inch horizontal room-darkening commercial grade aluminum at a minimum thickness of 0.2mm (.008") (after coating) with a minimum of 45.72 slats per meter (15 slats per foot). Provide blinds at each exterior window and at any interior window where privacy may be required.

Provide and install one full size sample for review and approval.

E201002 1.2 SHADES

Provide energy efficient solar shading systems for exterior windows. The system must maintain visibility while reducing glare, solar heat gain during the summer and heat loss during the winter. Openness configuration must be no more than 5% for most areas. The system fabrics and components must be dimensionally stable and must be manufactured to withstand fading, fire, mildew, and soiling.

E201002 1.3 DRAPERIES AND HARDWARE

Draperies must be manufactured under General Services Administration (GSA) contract as part of FF&E. Drapery can be accordion-fold, ripple-fold, or pinch-pleat with associated hardware suitable for the project requirements. All draperies must meet the National Fire Protection Association (NFPA) Code 701 California Fire Marshall's flame retardant requirements.

E201003 SEATING (FIXED)

E201003 1.1 AUDITORIUM, LECTURE AND CLASSROOM SEATING

The system must permit the standards to be installed on radial lines from a common center for which concentric circles are determined with each row of units utilizing common middle standards. Standards in each row must be placed laterally so the aisle-end standards will be in alignment as indicated on seating layout drawing. The angle of inclination of backs must be adjusted for variations in sightlines. Mechanical attachment of components must be of sufficient flexibility so that when permanently assembled they will compensate for the changing dimensions laterally between standards caused by convergence toward the center. Seat and back attachments must absorb inaccuracies in lateral spacing of standards at point of attachment caused by unevenness of floor. Varying lateral dimensions of backs and seats must be in accordance with approved seating layout. Minimum width of seating unit must be 20 inches and may be used only to complete a specific row dimension.

E201003 1.2 FIXED TABLES FOR AUDITORIUM, LECTURE AND CLASSROOMS

Provide worksurfaces mounted to tubular steel, sheet steel, or cast iron floor standards. The standards must be formed to fit the floor incline so that the standards will be vertical. The feet must be formed to eliminate tripping hazards and have holes for bolt attachment to the floor. Provide riser standards, cantilevered standards and aisle and end standards as required. Provide communications, data and power routing as required. Provide a high-pressure plastic laminate over medium density particleboard for the worksurfaces with coordinating vinyl or resin edge detail.

E2020 MOVABLE FURNISHINGS

Furnishings, Fixtures, and Equipment (FF&E) must include furniture, shop equipment, audiovisual equipment, and specialty equipment. Weapon racks, drying cages, and lockers are not considered FF&E. FF&E must be fully integrated with the building systems and finishes. FF&E may also include specialty items for which

the customer activity must be responsible for specifying.

Design and provide as required FF&E for all areas as developed during client programming. Design an FF&E package and prepare supporting plans and procurement data in accordance with the general interior design requirements in UFC 3-120-10.

E2020 1.1 FF&E PACKAGE

FF&E Package: Design and provide a fully usable and complete facility to include a FF&E movable furnishings package from Government supply sources according to Federal Acquisition Regulations. The FF&E will include, but not limited to, systems and modular furniture, training and conference furniture, seating, tables, artwork, decorative window covering, specialty furniture and equipment, dormitory room furnishings, and accessories. Naval Supply Systems Command (NAVSUP) Blanket Purchase Agreements (BPA) must be used whenever possible. The government will provide separate funding for the FF&E package. Construction funds will not be used. The FF&E Package must include shipping, freight, handling, installation and the Handling and Administration Rate (HAR) percentage as applied to the final FF&E total cost.

E2020 1.1.1 Authorization

The government will provide separate funding for procurement of the FF&E package. Upon receipt of required funding, the Contractor must be authorized by the Contracting Officer as a planned line item modification to the contract/task order to procure all FF&E using predominately negotiated Federal contracts. The amount of the modification will be the actual cost of these items from the Federal price schedules or NAVSUP BPAs, including any freight and installation charges from the furniture supplier as well as the Contractor's FF&E Handling and Administration Rate (HAR). The HAR includes all of the prime Contractor's effort related to storage, coordination, handling, administration of subcontractors, and all other associated costs and profit for the procurement of FF&E. The prime Contractor will propose in the contract/task order solicitation the FF&E HAR. The Contractor's proposed HAR may not exceed 5% of the total FF&E costs, as noted on the bid schedule. No other charges, expenses, fees, or markups will be authorized.

The government Interior Designer will approve the final FF&E submittal. The FF&E package will be presented to the Contracting Officer and the Contractor must provide the FF&E exactly as specified and approved.

The Contractor will receive a letter of authorization from the Contracting Officer citing the name of the furniture dealer and other information to use when accessing the government supply sources.

E2020 1.2 PURCHASE AND INSTALLATION

Coordinate the building completion date with the installation dealer specified in the FF&E Package. The Contractor or Contractor's representative is responsible for the following: issuing purchase orders, receiving acknowledgements, sending copies of purchase orders to the installation dealer(s) specified in the FF&E package, and providing necessary deposits

to furniture manufacturers.

The FF&E installation dealer(s) is responsible for the following: Receiving and installing all FF&E specified in the FF&E package, coordinating delivery and installation with the Contractor, inspecting for damage, providing delivery receipts to the Contractor, filing necessary freight claims, hanging artwork, bulletin boards, etc., removing packaging material, cleaning up the site upon completion, and adhering to Contractor's safety requirements.

E2020 1.2.1 Use of GSA Schedules and Blanket Purchase Agreements (BPAs)

The prime Contractor or FF&E dealer will be authorized to purchase supplies or services from the Navy Furniture BPAs for FF&E requirements, under the terms of the contract. The Contractor will receive a letter of authorization from the Contracting Officer citing the name of the furniture dealer and other information to use when accessing the government supply sources or BPAs.

E2020 1.2.2 Deposits

The Contractor must anticipate providing a deposit of between 30% to 50% of the furniture costs when placing their order.

Manufacturer price increases must be anticipated. Recommend ordering FF&E product once funds are received to avoid incurring additional costs. Delayed production and delivery dates can be noted at the time of order placement to coincide with building completion dates. Any costs incurred due to manufacturer price increases will be the burden of the Contractor.

E2020 1.2.3 Davis Bacon Wages

Davis Bacon wages do not apply to the FF&E installer from the government supply sources. The workforce for the FF&E installation and delivery must be separate and distinct from the labor workforce performing under the construction contract.

E2020 1.2.4 Sales Tax

Exemptions for certain State or Local taxes may be available to the Contractor and/or its subcontractors. The Contractor must take maximum advantage of all exemptions, including obtaining a resale permit, from State and Local taxation authorities whether available to it directly or available to the Contractor based on an exemption afforded the government. The responsibility for paying applicable taxes rests with the contractor. State and local taxes applicable to the FF&E line will be included with the subcontractor's quote, if applicable.

E2020 1.2.5 Bonds

FF&E line item is not considered construction and the prime Contractor will not be required to secure any additional bond for the award of the FF&E line item unless otherwise indicated in the RFP. If any additional bond is required for the FF&E line item it is to be included

in the prime Contctor's FF&E HAR.

E2020 1.2.6 Unique Item Identification (IUID) and Validation

Unique item identification and valuation is a system of marking and valuing items delivered to DoD that enhances logistics, contracting, and financial business transactions. The IUID policy is mandatory for all DoD contracts that require the delivery of items. An item is a single article or a single unit formed by a grouping of subassemblies, components or constituent parts. Provide DoD Unique item identification, valuation and delivery of data for all required FF&E items for which the government's unit acquisition cost is $5,000 or more.

E2020 1.2.7 Buy American Act and Trade Agreement Act

All supplies under the FF&E line item are subject to the Buy American Act and Trade Agreement Act (TAA). The GSA contracts and NAVSUP Blanket Purchase Agreements are required to comply with the Buy American Act and TAA.

E2020 1.2.8 Small Business Requirements

The FF&E is subject to the Contractor's Small Business Goals however the government requires the furniture be purchased from NAVSUP Blanket Purchase Agreements (BPA). Most manufacturers on the Office Furniture BPA are large business and most manufacturers on the Dorm and Quarters BPA are small business. Installation dealers are small business. Under the terms of the BPA, the FF&E must be ordered directly through the GSA manufacturer. Using pass-through companies to achieve Small Business Goals will not provide the Contractor credit unless they manufacturer 20% or provide 50% of the service purchased. The government will not incur additional costs to use small business.

E2020 1.2.9 Installation

The FF&E package includes the installation of all furniture and furnishings as specified in the FF&E package. The installation dealer specified in the FF&E package will receive, store, if required, transport to the project site, off load, inside deliver, unpack, assemble, place/install, clean, if required, and dispose of all the trash for all furniture and furnishings. The Contractor's Interior Designer will be responsible for specifying installation services and warehousing, as required, for all collateral equipment. It is the Contractor's responsibility to coordinate the building completion, occupancy, and furniture installation dates with the installation dealer specified in the FF&E package. Any costs associated with storing or delaying furniture shipments is the responsibility of the Contractor.

E2020 1.2.10 Installation Warranty

Install all movable furnishings in accordance with the manufacturer’s instructions and warranty requirements. All movable furnishings must be level and aligned and all doors, drawers and accessories must be level and aligned to open, close and otherwise operate smoothly

and securely. All systems furniture must be installed by the systems furniture manufacturer's dealer of record and not the General Contractor. Repair, to the customer's satisfaction, any/all damage to any facility finish that is a result of the furniture installation and correct all punch list items for the furniture/furnishings.

E2020 1.2.11 Ordering Documentation

Provide two copies of all ordering documentation to the Contracting Officer including Factory Order number (FO) and warranty information.

E2020 1.2.12 Post Award Changes

After award of the FF&E line item modification, any request to change the FF&E items must be submitted on the Contracting Officer. The FF&E modification has been accepted, priced, and negotiated based on specific line items as detailed in the final package. Those items have been agreed to considering color, specific type and quality of material, price, sustainability, life cycle, and dealership service. The Government will expect and require the Contractor to provide exactly those items. Should changes become necessary, careful consideration is required to ensure that equivalent quality, price and other aspects of the item are maintained. Otherwise, price adjustments must be negotiated. The Contracting Officer will obtain approval from the Government Interior Designer/Collateral Equipment Manager in consultation with the client for any changes to the FF&E.

Post award FF&E manufacturer's price increases are the responsibility of the Contractor and will not be transferred to the government. Recommend ordering FF&E product once funds are received to avoid incurring additional costs. Delayed production and delivery dates can be noted at the time of order placement to coincide with building completion dates.

E2020 1.3 BEST VALUE DETERMINATION

A best value determination is required by Federal Acquisition Regulation (FAR) 8.404 when placing orders against Federal Supply Schedules for the selection of furniture and furnishings. A Best Value Determination (BVD) must also be provided for FF&E installation services. Best Value is defined in FAR 2.101 as ensuring that the order to be placed under a Federal Supply Schedule results in the lowest overall cost alternative (considering price, special features, administrative costs and client's needs) to meet the government's needs.

The Contractor's Interior Designer is responsible for the following written BVD justifications:

$3,000 or less: For any procurement in the FF&E package with a value of $3,000 or less, the Interior Designer may utilize any BPA holder. If the BPA holders cannot supply the item, then any other manufacturer may be utilized.

Greater than $3,000 and $150,000 or less: for any procurement in the FF&E package with a value greater than $3,000 and $150,000 or less, the Contractor's Interior Designer must always review pricing from at least

three manufacturers as well as UNICOR. In addition to the review of published list prices, the Contractor's Interior Designer must confirm the pricing with the vendor. Manufacturer's quotes are NOT required. The BVD form must be completed and submitted for all FF&E procurements greater than $3,000 and $150,000 or less.

Greater than $150,000: The Contractor's Interior Designer must solicit proposals from all BPA holders under the applicable group for FF&E procurements greater than $150,000. UNICOR must always be solicited. The Contractor's Interior Designer must develop performance criteria and project requirements based on a generic design for the BPA holders and UNICOR to develop a price and performance proposal. The BVD form must be completed and submitted for all FF&E procurements greater than $150,000 and manufacturer's quotes and a summary of all proposals must be attached.

Federal Prison Industries (UNICOR) must be considered as part of all BVDs. This must be done by sending an email with the requirements and evaluation criteria if they are not comparable in one or more areas of price, quality, and time of delivery, the designer can specify product under NAVSUP BPA or GSA schedule.

The best value determination must address issues such as space planning; human factors data related to anthropometrics (reach, clearance, adjustability), space, and acoustics; ergonomics; product quality (including construction and materials); sustainability features, product warranties; history of the product and/or manufacturer; ability to service products through dealers or others within a certain geographical range of the project; price (including freight); aesthetics; appropriateness; and lighting, power and telecommunications systems management and/or coordination as related to the facility (when applicable); and other project specific factors as identified and/or required. Emphasis must be to create a fully integrated design solution by providing quality products to meet the functional needs of the customer. Customer preferences must be considered. The focus must be on the best overall value. Use the GSA Best Value Determination forms provided in Part 6 of this RFP as guidelines for information to be provided.

E202001 MOVABLE ART WORK

Provide artwork for wall installation as part of the FF&E Submittal according to the project program. Installation of artwork to be completed by installation dealer specified in the approved FF&E package. Type of artwork to be determined by client requirements and budget as described in the Project Program for the project. Install framed artwork 63 inches (1600 mm) on center above finished floor. Include security mounting hardware as required.

E202002 MODULAR PREFABRICATED FURNITURE

E202002 1.1 FURNITURE SYSTEMS

Provide products that meet the NAVFAC performance specifications for systems furniture. The Government Interior Designer must approve any other systems furniture manufacturer. The typical workstation must maximize each allocated space with worksurfaces and overhead closed storage with a surface to accommodate a Government provided computer. An attached articulated keyboard/mouse tray must be selected or provided. Provide a monitor lift

if required by the project program.

Powered raceways that will accommodate data and voice wire management must be completely coordinated with all facility systems. The Contractor's Interior Designer must ensure the coordination of all electrical/data and furniture locations. Use of power poles will not be permitted to power FF&E. Provide and coordinate all telecommunication receptacles and outlet requirements (i.e. RJ 11/45 receptacles and cover plates) with the Contractor's Interior Designer and the systems furniture installer. Hardwire all pre-wired furniture with the building systems, and coordinate all Information technology (IT) and telephone connections.

E202002 1.2 MODULAR FREESTANDING FURNITURE AND WORKSTATIONS

Provide products that meet the NAVFAC performance specifications for modular freestanding furniture including wood. Provide modular furniture with electrical/data cable trays and grommet holes for private offices and smaller work areas. An attached articulated keyboard/mouse tray (and monitor lift if required by the project program) must be selected. Provide wood surfaces as appropriate. Include accommodation for a Government provided computer and printer.

E202003 FREESTANDING FURNITURE

E202003 1.1 SEATING

E202003 1.1.1 Task Seating

Provide task seating that is fully ergonomic and coordinated by finish and scale to the workstation. Seating specifications to include: adjustable arms, back, height, and seat pan; 5 star base, appropriate castors for floor surface, lumbar support and availability in a minimum of two (2) sizes. Task seating can be from the same manufacturer as the systems or major furniture supplier or other seating manufacturer as approved by the government Interior Designer, provided it is determined to be a BPA "Best Value".

E202003 1.1.2 Lounge, Reception and Guest Seating

Provide lounge, reception and guest seating with upholsteries consistent with the Project Program. Seating must be easily reupholstered or have removable covers.

E202003 1.1.3 Training Room Seating

Provide seating with passive ergonomic features in that the seat and back offers some synchronized movement to allow the person seated to change positions. The support can be legs, sled base or single pedestal with 5 star base and casters as determined by user requirements. Provide high density stack chairs or nesting chairs as required. Provide attached, storable tablet arm as required.

E202003 1.2 STORAGE AND FILING

Provide freestanding storage units, file cabinets and file safes to accommodate the specific and unique storage requirements of the user.

Coordinate closely with storage provided in PTS Section E10, *Equipment*, for high density filing.

E202003 1.3 CHILD DEVELOPMENT CENTERS

Provide all child care and classroom furnishings such as cribs, rocking chairs, feeding chairs, tables, seating, toy storage, book display storage, activity centers, freestanding floor activity toys, and any other required furnishings. Outdoor structural play equipment may be required. The cribs must be of stainless steel construction. The chairs and tables must be appropriately sized for each age group.

E202003 1.4 TRAINING/CONFERENCE ROOM FURNISHINGS

E202003 1.4.1 Tables

Provide single or multi-person worksurfaces or tables as determined from user requirements. Where computers are used, provide tables with wire management capability or pre-wired tables to accommodate data/telecommunications requirements. Powered raceways that will accommodate data and voice wire management must be completely coordinated with all facility systems. The Contractor's Interior Designer must ensure the coordination of all electrical/data and furniture locations. Provide and coordinate all telecommunication receptacles and outlet requirements, hardwire all pre-wired furniture with the building systems and coordinate all IT and telephone connections.

E202003 1.4.2 Fixed Presentation Furnishings

Provide markerboards with porcelain on steel writing surfaces. Coordinate with building construction to include appropriate blocking or structural support for the installation of markerboards and tackboards.

E202003 1.4.3 Movable Presentation Furnishings

Provide audio-visual carts, lecterns, multi-media presentation cabinets to accommodate power/data requirements.

E202003 1.5 DINING ROOM FURNISHINGS

E202003 1.5.1 Cafeteria, Dining Hall Furnishings

Provide stackable seating and associated dollies for transport and storage, tables with folding or fixed legs or flip tops, and associated mobile carts for transport and storage, and trash and recycling containers.

E202003 1.5.2 Executive Dining Furnishings

Provide premium quality dining furnishings to include tables, chairs, buffet and serving units, hutches and cabinets as require by the Project Program.

E202004 RUGS & ACCESSORIES

E202004 1.1 RUGS

Provide Area or Accent rugs. Refer to the Project Program for requirements.

E202004 1.2 LAMPS

Provide decorative lamps. Refer to the Project Program for requirements.

E202004 1.3 INTERIOR LANDSCAPING

Provide artificial plants of a variety of sizes and 'species' to provide interior landscaping, including planters or containers for artificial plants to coordinate with the interior finishes and furnishings of the project.

E202004 1.4 OTHER DECORATIVE ITEMS

Refer to the Project Program for requirements.

E202090 OTHER MOVABLE FURNISHINGS

E202090 1.1 MISCELLANEOUS ITEMS

E202090 1.1.1 Containers

Provide waste receptacles, recycling containers, and ash urns as required.

E202090 1.1.2 Accessories

Provide clocks, wall mounted or freestanding literature and coat racks, and mirrors as required.

E202090 1.1.3 Small Equipment

Provide small appliances such as coffee pots, microwaves, refrigerators, washers, dryers, and icemakers, as required.

E202090 1.1.4 Special Equipment

Provide mailroom work and storage tables, mail sorter units, carts and equipment tables as required.

-- End of Section --

SECTION G10

SITE PREPARATION
09/22

G10 GENERAL

RFP Part 3 including the Engineering System Requirements (ESR) provide project specific requirements. The RFP Part 4, Performance Technical Sections (PTS) provide generalized technical requirements that apply to multiple facility types and include more requirements than are applicable to any one project. Therefore, only the RFP Part 4 requirements that apply to the project and further define the RFP Part 3 project specific requirements are required.

G10 1.1 DESIGN GUIDANCE

Provide the design and installation in accordance with the following references. This Performance Technical Specification (PTS) adds clarification to the fundamental requirements contained in the following Government Standards. The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification*.

Industry standards, codes, and Government standards referenced in the section text that are not found in the Unified Master Reference List (UMRL) in the Federal Facility Criteria (FFC) at the Whole Building Design Guide (WBDG) website, are listed below for basic designation identification. Comply with the required and advisory portions of the current edition of the referenced standard at the time of contract award.

G10 1.1.1 Industry Standards and Codes

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

Refer to UMRL for reference designation identification.

G10 1.1.2 Government Standards

CORPS OF ENGINEERS (COE)

COE EM 385-1-1	Safety and Health Requirements Manual

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s):UFC 1-200-02, High Performance and Sustainable Building RequirementsUFC 3-201-01, Civil EngineeringUFC 3-220-01,

	Geotechnical Engineering)
UFC 3-810-01N	Navy and Marine Corps Environmental Engineering for Facility Construction

UNIFIED FACILITIES GUIDE SPECIFICATIONS (UFGS)

UFGS 31 23 00.00 20	Excavation and Fill
UFGS 01 57 19	Temporary Environmental Controls
UFGS 02 61 13	Excavation and Handling of Contaminated Material
UFGS 02 61 23	Removal and Disposal of PCB Contaminated Soils
UFGS 02 65 00	Underground Storage Tank Removal

G10 1.2 PERFORMANCE VERIFICATION AND ACCEPTABLE TESTING

Compliance with the requirements will be determined by a review of the design and construction submittals and by field inspection. See Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, and Part 2 Section 01 33 00.05 20, *Construction Submittal Procedures*, for additional requirements. Verify earthwork performance via testing detailed in the paragraph, "Field Quality Control", in UFGS Section 31 23 00.00 20, *Excavation and Fill*.

G10 1.3 DESIGN SUBMITTALS

Submit design submittals in accordance with Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, FC 1-300-09N, *Navy and Marine Corps Design Procedures*, UFC 3-201-01, *Civil Engineering*, and UFC 3-220-01, *Geotechnical Engineering*.

In addition, UFGS sections listed below or in the body of the PTS text are to be used by the Designer of Record (DOR) as a part of the design submittal. If the UFGS products or systems are applicable to the project, the DOR is required to edit these referenced UFGS sections and submit them as a part of the design submittal specification. Edit the specification sections in accordance with the limitations stated in PTS section Z10, *General Performance Technical Specifications*.

UFGS 31 23 00.00 20, *Excavation and Fill.*

Provide sustainability submittals in accordance with Part 2 Section 01 33 29, *Sustainability Requirements and Reporting*.

G10 1.4 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*. In addition to the Z10 requirements, the Designer of Record (DOR) is required to approve the following construction submittals as a minimum:

Submittals in Part 2 UFGS Section 01 57 19, *Temporary Environmental Controls.*

Submittals in UFGS Section 02 61 13, *Excavation and Handling of Contaminated Material*

Submittals in UFGS Section 31 23 00.00 20, *Excavation and Fill*.

Submittals in UFGS Section 02 61 23, *Removal and Disposal of PCB Contaminated Soils*.

Submittals in UFGS Section 02 65 00, *Underground Storage Tank Removal.*

Waste Management Plan in accordance with Part 2 UFGS Section 01 74 19, *Construction Waste Management and Disposal*.

Provide sustainability submittals in accordance with Part 2 UFGS Section 01 33 29, *Sustainability Requirements and Reporting*.

G10 1.5 GEOTECHNICAL REPORT

G10 1.5.1 Subsurface Soils Information

Provided subsurface soil information is included for the Contractor's information only, and is not guaranteed to fully represent all subsurface conditions. The data included in this RFP is intended for proposal preparation and preliminary design only. Perform, at the Contractor's expense, such subsurface exploration, investigation, testing, and analysis for the design and construction of the site improvements.

All work by the Contractor-provided Geotechnical Engineer at the project location, if required, must be coordinated with the Contracting Officer and must not interfere with normal base operations. A minimum of two weeks prior to the Foundation Work Design submittal, provide the Contractor's Geotechnical Report (an Adobe Acrobat PDF version on CD and two printed copies) for review and record keeping purposes. The report becomes the property of the Government. Provide the geotechnical reports generated during construction, such as pile driving results and analysis, to the Contracting Officer (an Adobe Acrobat PDF version and two printed copies) for record keeping purposes.

G10 1.5.2 Contractor-provided Geotechnical Engineer

The Contractor-provided Geotechnical Engineer is required to be experienced with soil conditions in the region where the project site is located. The Geotechnical Engineer is required to evaluate the RFP data, obtain and evaluate additional data to support the design and construction, and prepare a Geotechnical Report.

Coordinate work by the Contractor-provided Geotechnical Engineer at

the project location with the Contracting Officer so as not to interfere with normal base operations. A minimum of two weeks prior to the Foundation Work Design submittal, provide the Contractor's Geotechnical Report (a searchable Adobe Acrobat PDF version on CD and two printed copies) for review and record keeping purposes. The report will become the property of the Government. Provide the geotechnical reports generated during construction, such as pile driving results and analysis, to the Contracting Officer. In addition, provide a searchable Adobe Acrobat PDF version and two printed copies for record keeping purposes.

G10 1.5.3 Contractor-Provided Geotechnical Report

Submit a written Geotechnical report based upon Government-provided subsurface investigation data and additional field and laboratory testing accomplished at the discretion of the Contractor's Geotechnical Engineer. Include in the Geotechnical Report all requirements listed in UFC 3-220-01, *Geotechnical Engineering*, paragraph entitled "Section 1803 Geotechnical Investigations"; in addition, include the following:

a. The project site description, vicinity map and site map indicating the location of borings and any other sampling locations. Provide 24 hour groundwater observations for at least 20 percent of the borings, minimum one boring. Provide notes explaining any abbreviations or symbols used and describing any special site preparation requirements.

b. Results of field and laboratory testing, whether Government or Contractor-provided. Address existing subsurface conditions, selection and design of the foundation and floor slab, underground construction including utility installation and other site specific requirements (such as soil stabilization and slope stability).

c. Engineering analysis, discussion and recommendations Addressing:

1) Settlement analysis - Limit settlement in accordance with UFC 3-220-01 *Geotechnical Engineering*and EM 1110-1-1904 "Settlement Analysis".

2) Bearing Capacity analysis.

3) Foundation selection (shallow, deep, special) and construction considerations; dimensions, and installation procedures.

4) Site preparation (earthwork procedures and equipment, compaction requirements, building slab preparation, soil sensitivity to weather and equipment, groundwater influence on construction, mitigation of expansive soils or liquefaction potential, and dewatering requirements).

5) Sheeting and shoring considerations.

6) Pavement design calculations with parameters defined, actual or assumed, and recommended thicknesses and materials.

7) Infiltration rate.

8) Haul routes and stockpile locations for earthwork.

9) Calculations to support conclusions and recommendations.

10) Present recommendations on a structure-by-structure basis.

A registered Geotechnical Engineer is required to sign the Geotechnical Report.

Accompany the submitted report with a cover letter identifying any report recommendations proposed to be adopted into the design which are interpreted by the Contractor as a changed condition to the Geotechnical or Pavement related requirements of the RFP.

G10 1.5.4 Geotechnical Site Data required in Design Drawings

The Contractor's final design drawings must include the Government-provided subsurface data presented in the RFP, as well as additional borings and laboratory test result data performed by the Contractor. The data provided is required to include:

a. Logs of Borings and related summary of laboratory test results and groundwater observations. Provide 24 hour groundwater observations for at least 20 percent of the borings, minimum one boring. Provide notes explaining any abbreviations or symbols used and describing any special site preparation requirements.

b. Indicate the locations of borings on the drawings. Revise the design drawings to reference the Contractor's Geotechnical Report as being a basis for design.

G1010 SITE CLEARING

G1010 1.1 GENERAL

Clear and grub project site for project construction.

G1010 1.2 BURNING

Where burning is permitted, adhere to the federal, state, and local regulations.

G101001 CLEARING

G101001 1.1 CLEARING

Clear trees, shrubs, brush and vegetation for construction of the project. Clearing includes the felling, trimming, and cutting of trees into sections and the satisfactory disposal of the trees and other vegetation designated for removal, including downed timber, snags, brush, and rubbish occurring within the areas to be cleared.

G101001 1.2 PRESERVATION

Preserve and protect trees, shrubs and vegetation not directly impacted by the construction in accordance with Part 2 Section 01 57 19, *Temporary Environmental Controls,* and PTS Section G205005, paragraph 1.1 *Existing Plant Material to Remain or be Transplanted*.

G101002 TREE REMOVAL

Remove and dispose of trees to a depth of at least 18 inches (450 mm) below ground surface. Fill depressions with satisfactory material and compact. Mound fill 2 inches (50 mm) above adjacent surface to allow for settling when not part of a subbase.

G101003 STUMP REMOVAL

Remove stumps to a depth of at least 18 inches (450 mm) below ground surface. Fill depressions with satisfactory material and compact. Mound fill 2 inches (50 mm) above adjacent surface to allow for settling when not part of a subbase.

G101004 GRUBBING

Within the clearing limits, remove and dispose of logs, shrubs, brush, matted roots, roots larger than 2 inches (50 mm) in diameter, and other debris to a depth of at least 18 inches (450 mm) below ground surface. Fill depressions made by grubbing with satisfactory material and compact to make the new surface conform to the adjacent surface of the ground.

G101005 SELECTIVE THINNING

G101005 1.1 TREE THINNING

Trim trees to remain of dead branches 1-1/2 inches (38 mm) or more in diameter. Cut limbs and branches in accordance with ANSI A300.

G101006 DEBRIS DISPOSAL

Prevent spillage on pavements, streets, or adjacent areas. Dispose of surplus and unsuitable material off of Government property.

G1020 SITE DEMOLITION & RELOCATIONS

G1020 1.1 GENERAL

Demolition work includes the demolition, removal and legal disposal of existing construction debris to accommodate the new construction. Take precautions to prevent damages to existing utilities, construction and materials not scheduled for demolition, repair or replacement; repair damages to the construction and materials to the satisfaction of the Contracting Officer and at no additional cost to the Government.

G1020 1.2 AUTHORIZATION

Do not begin demolition until the Demolition Plan has been approved by, and authorization is received from, the Contracting Officer.

G1020 1.3 TITLE TO MATERIALS

Whenever possible, salvage or recycle features demolished in lieu of disposing of as waste in a landfill. Existing features to be demolished which are not salvageable or reused become the property of the Contractor, and must be removed from the project site. The Government will not be responsible for the condition, loss of, or damage to, such property after contract award. Materials and equipment cannot be viewed by prospective purchasers or sold on the site.

G1020 1.4 REUSE OF MATERIALS AND EQUIPMENT

Remove and store materials and equipment to be reused or relocated to prevent damage, and reinstall as the work progresses.

G1020 1.5 SALVAGED MATERIALS AND EQUIPMENT

Deliver salvaged materials and equipment that are to be removed by the Contractor and that are to remain the property of the Government to a storage site on the installation, in accordance with instructions of the Contracting Officer.

G102001 BUILDING MASS DEMOLITION

Refer to Section F20, *Selective Building Demolition*, for additional information.

G102002 ABOVEGROUND SITE DEMOLITION

G102002 1.1 DUST AND DEBRIS CONTROL

Prevent the spread of dust and debris to occupied portions of a building or on pavements and avoid the creation of a nuisance or hazard in the surrounding area. Do not use water for dust control if it results in hazardous or objectionable conditions such as, but not limited to, ice, flooding, or pollution. Sweep pavements to control the spread of debris that may result in foreign object damage potential to aircraft.

G102002 1.2 PROTECTION

G102002 1.2.1 Traffic Control

Where pedestrian and driver safety is endangered in the area of removal work, provide traffic control in accordance with FHWA Manual on Uniform Traffic Control Devices (MUTCD).

G102002 1.2.2 Foreign Object Damage (FOD)

Remove potential FOD debris and waste materials on or adjacent to operational airfield pavements due to the Contractor's operations. Install a temporary barricade at the Contractor's expense. The barricade is required to include a fence covered with a fabric designed to stop the spread of debris. Anchor the fence and fabric to prevent displacement by winds or jet/prop blasts. Remove barricade when no longer required.

G102002 1.2.3 Existing Work

Protect existing work that is to remain in place, be reused, or remain the property of the Government. At no additional expense to the Government, repair items that are damaged during performance of the work to original condition, or replace with new. Do not overload pavements to remain.

G102002 1.2.4 Noise Pollution

G102002 1.3 PAVING AND SLABS

Remove concrete and asphaltic concrete paving and slabs as required for construction of project. Remove the existing aggregate base in areas to receive new pavement to the depth of the proposed pavement section below new finish grade. Remove the existing aggregate base in areas not to receive new pavement to a depth of 8 inches (200 mm) below existing adjacent grade and break remaining pavement (if any) to allow drainage. Provide neat sawcuts at limits of pavement removal; protect sawcuts so that new pavement butts against the existing without feathering.

G102002 1.4 ABOVEGROUND STORAGE TANKS

Perform work in accordance with specification and plans provided in Parts 5 and 6.

G102003 UNDERGROUND SITE DEMOLITION

G102003 1.1 UTILITY TERMINATION

Terminate utilities in accordance with state and local rules and regulations; the nationally recognized code; and the requirements of the utility provider covering the specific utility; UFC 3-201-01, *Civil Engineering*; and approved by the Contracting Officer.

G102003 1.2 PROTECTION OF EXISTING UTILITIES

Protect existing utilities to remain. Where removal of existing utilities and pavement is required, provide approved barricades, temporary covering of exposed areas, and temporary services or connections. Repair damage to existing utilities to remain at no additional expense to the Government.

G102003 1.3 UNDERGROUND STORAGE TANKS

Perform work in accordance with specification and plans provided in Parts 5 and 6.

G102004 BUILDING RELOCATION

Refer to Section F20, *Selective Building Demolition*, for additional information.

G102005 UTILITY RELOCATION

Repair relocated items that are damaged or replace damaged items with new undamaged items at no additional expense to the Government.

G102006 FENCING RELOCATION

Remove and replace post foundations. Repair relocated items that are damaged or replace damaged items with new undamaged items at no additional expense to the Government. Refer to Section G204001 for requirements for new fence systems.

G102007 SITE CLEANUP

Remove rubbish and debris from the installation daily; do not allow accumulations inside or outside the building(s) or on pavements. Store materials that cannot be removed daily in areas specified by the Contracting Officer.

G102007 1.1 SPILLS

In the event of a spill or release of hazardous substances, pollutant, contaminant or oil, notify the Contracting Officer immediately. Take immediate containment actions to minimize the effect of any spill or leak in accordance with the ESR and the approved spill work plan as described in Part 2 Section 01 57 19, *Temporary Environmental Controls*. Perform clean up at no additional expense to the Government.

G1030 SITE EARTHWORK

G1030 1.1 GENERAL

This section includes the design and construction requirements for earthwork and grading related to construction of the roadways, parking, paved areas and other related sitework. Refer to Section A10, *Foundations*, for earthwork related to construction of structures, including building, footings, foundations, retaining walls, slabs, tanks, and utility appurtenances.

The Designer of Record is required to utilize UFGS Section 31 23 00.00 20, *Excavation and Fill*, for the project specification, and to submit the edited specification section as a part of the design submittal for the project.

G103001 GRADING

Provide site grading in accordance with the requirements of UFC 3-201-01, *Civil Engineering*.

G103001 1.1 ELEVATIONS

Establish finish floor elevations in accordance with UFC 1-200-01, *DoD Building Code(General Building Requirements)*, and UFC 3-101-01, *Architecture*.

G103001 1.2 SITE GRADING

Grade the site such that associated storm water runoff does not adversely affect surrounding sites. Preserve natural topographic features to minimize the impact on the existing drainage patterns at and adjacent to the site.

G103001 1.3 FINISHED SURFACES

Provide finish grading with drainage towards new and existing drainage features and with no resulting low spots that hold water or that direct runoff towards new or existing facilities or site amenities.

G103001 1.4 RODENT AND VEGETATION CONTROL

Prevent and eliminate standing water.

G103002 COMMON EXCAVATION

Preserve natural topographic features to minimize cut and fill requirements. Unsuitable material and surplus excavation becomes the property of the Contractor, and must be disposed of as indicated in the Project Program.

G103003 ROCK EXCAVATION

If blasting is allowed, conduct it in accordance with EM 385-1-1 and Federal, state, and local safety regulations. Provide blasting mats and use non-electric blasting caps. Notify the Contracting Officer 24 hours prior to blasting.

Do not make requests for additional compensation for degree of hardness or difficulty encountered in removal of material. Unsuitable material and surplus excavation becomes the property of the Contractor, and must be disposed of as indicated in the Project Program.

G103004 FILL & BORROW

G103004 1.1 SOURCES

Where sufficient topsoil and satisfactory materials are not available on the project site, provide suitable borrow materials.

G103004 1.2 REQUIREMENTS FOR OFF SITE SOIL

Test off-site soil in accordance with UFGS Section 31 23 00.00 20, *Excavation and Fill*, section titled "Requirements for Off Site Soil".

G103004 1.3 UNSATISFACTORY SOIL MATERIALS

Remove uncontaminated unsatisfactory soil materials from the site. Unsatisfactory materials are materials which do not comply with the requirements for satisfactory materials. Unsatisfactory materials also include man-made fills, trash, refuse, backfills from previous construction or material classified as satisfactory which contains root and other organic matter, frozen material, and stones larger than 3 inches. The Contracting Officer shall be notified of any contaminated materials.

G103004 1.4 TOPSOIL

Refer to Section G2050, "Landscaping". Remove unsatisfactory, existing topsoil from the site in accordance with the Project Program.

G103005 COMPACTION

Provide compaction in accordance with UFGS Section 31 23 00.00 20, *Excavation and Fill*, and the recommendations of the Contractor's Geotechnical Engineer, whichever is greater.

G103006 SOIL STABILIZATION

Provide soil stabilization designed to function as required by site conditions in accordance with the State Highway specifications and standards in the state where the project is located. Apply and install geosynthetics in accordance with the manufacturer's written instructions.

G103007 SLOPE STABILIZATION

Provide slope stabilization methods in accordance with the State Highway specifications and standards in the state where the project is located. Design and install manufactured products, gabions, geogrids, rock anchors in accordance with the manufacturer's written instructions.

G103008 SOIL TREATMENT

G103008 1.1 TERMITE CONTROL

Refer to Section A1010 1.2, "Termite Control".

G103009 SHORING

Provide sheeting, shoring, bracing, cribbing and underpinning in accordance with the Army Corps of Engineer's Safety and Health Requirements Manual (COE EM 385-1-1), UFC 3-220-01, *Geotechnical Engineering*, UFC 3-301-01, *Structural Engineering*, and other Federal, State and local codes and requirements.

Provide protection of existing structures.

G103010 TEMPORARY DEWATERING

The design of the temporary dewatering system is required to account for soil conditions, rainfall, fluctuations in the groundwater elevations and the potential settlement impact on adjacent facilities due to dewatering. Provide dewatering in accordance with UFGS Section 31 23 00.00 20, *Excavation and Fill*. While the excavation is open, maintain the water level continuously, at least 1.0 foot (0.30 m) below the working level.

French drains, sumps, ditches or trenches are not allowed within 3 feet (0.9 m) of the foundation of any structure without written approval of the Government's Civil/Geotechnical Reviewer.

G103011 TEMPORARY EROSION & SEDIMENT CONTROL

G103011 1.1 TEMPORARY EROSION & SEDIMENT CONTROL

Develop and implement temporary erosion and sediment control measures and other Best Management Practices (BMPs) prior to or in conjunction with commencement of earthwork in accordance with the state Erosion and Sediment Control Laws and Regulations. Remove non-permanent erosion control measures after vegetation is fully established.

G103011 1.2 MAINTENANCE

Maintain temporary erosion control measures in accordance with state Erosion and Sediment Control Laws and Regulations throughout the project until areas are fully stabilized.

G103090 OTHER SITE EARTHWORK

G103090 1.1 HISTORIC AND ARCHAEOLOGIC ARTIFACTS

Refer to Part 2 UFGS Section 01 50 00, *Temporary Construction Facilities and Controls*.

G103090 1.2 PIPELINE CASING UNDER RAILROADS OR PAVEMENTS

Where required by code or local practice provide casing for piping under railroads or pavements. The Contractor is responsible for obtaining permits from government and nongovernment owners/agencies as required to perform the work.

G103090 1.3 TOPSOIL AND SEED

Provide topsoil and seed according to UFGS Section 31 23 00.00 20, *Excavation and Fill*, except when landscaping is required.

G1040 HAZARDOUS WASTE REMEDIATION

Perform work in accordance with specification and plans provided in Parts 5 and 6.

G1040 1.1 EXCAVATION

Perform excavation of contaminated soil and groundwater as indicated in the RFP, in accordance with the ESR and the approved contaminated soil and groundwater removal work plan as described in Part 2 Section 01 57 19, *Temporary Environmental Controls*. Excavate areas of contamination to the depth noted elsewhere in the RFP. Select methods and equipment to minimize disturbance to areas beyond the limits of the excavation area. Remove and dispose of material that becomes contaminated as a result of the Contractor's operations at no additional cost to the Government. Where excavation extends into groundwater levels, employ dewatering methods on a localized basis to facilitate excavation operations. Collect water generated by dewatering during excavation and test in accordance with the ESR and the approved work plan.

Dispose of water that contains contaminants above the levels indicated in the ESR in accordance with the ESR and the approved work plan.

Non-contaminated water may be disposed of on-site.

G1040 1.2 STOCKPILED SOILS

Stockpile soils determined to be contaminated in accordance with the criteria in the ESR and the approved contaminated soil and groundwater removal work plan as described in Part 2 Section 01 57 19, *Temporary Environmental Controls.* Dispose of stockpiled soils in accordance with the requirements of the ESR.

Soils that are determined to contain contaminants below the criteria listed in the ESR may be used as clean fill.

G1040 1.3 CLEAN FILL

Backfill and compact soils that are determined as clean fill via testing in accordance with the requirements listed in the ESR.

G1040 1.4 SPILLS

In the event of a spill or release of hazardous substances, pollutant, contaminant or oil, notify the Contracting Officer immediately. Take immediate containment actions to minimize the effect of any spill or leak. Perform clean up at the Contractor's expense in accordance with the ESR and the approved spill work plan as described in Part 2 Section 01 57 19, *Temporary Environmental Controls*.

G1040 1.5 DISPOSAL

Manage, transport and dispose of waste materials in accordance with specification and plans provided in Parts 5 and 6.

-- End of Section --

SECTION G20

SITE IMPROVEMENTS
09/22

G20 GENERAL

RFP Part 3 including the Engineering System Requirements (ESR) provide project specific requirements. The RFP Part 4, Performance Technical Sections (PTS) provide generalized technical requirements that apply to multiple facility types and include more requirements than are applicable to any one project. Therefore, only the RFP Part 4 requirements that apply to the project and further define the RFP Part 3 project specific requirements are required.

G20 1.1 DESIGN GUIDANCE

Provide the design and installation in accordance with the following references. This Performance Technical Specification (PTS) adds clarification to the fundamental requirements contained in the following Government Standards. The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification*.

Industry standards, codes, and Government standards referenced in the section text that are not found in the Unified Master Reference List (UMRL) in the Federal Facility Criteria (FFC) at the Whole Building Design Guide (WBDG) website, are listed below for basic designation identification. Comply with the required and advisory portions of the current edition of the referenced standard at the time of Contract award.

G20 1.1.1 Industry Standards and Codes

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

AMERICAN SOD PRODUCERS ASSOCIATION (ASPA)

U.S CONSUMER PRODUCT SAFETY COMMISSION, PUBLICATION NO. 325

Refer to UMRL for reference designation identification.

G20 1.1.2 Government Standards

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

FS RR-F-191	Fencing and Wire and Post Metal (and Gates, Chain-link Fence Fabric, and Accessories)

FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements) (A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core

	UFCs that are listed therein, which includes the following significant UFC(s):UFC 1-200-02, High Performance and Sustainable Building RequirementsUFC 3-201-01, Civil EngineeringUFC 3-201-02, Landscape ArchitectureUFC 3-210-01, Low Impact Development UFC 3-220-01, Geotechnical Engineering
UFC 3-250-01	Pavement Design for Roads and Parking Areas
UFC 3-270-01	Asphalt Maintenance and Repair
UFC 3-270-02	Asphalt Crack Repair
UFC 3-270-03	Concrete Crack and Partial Depth Spall Repair
UFC 3-270-04	Concrete Repair
UFC 4-022-02	Selection and Application of Vehicle Barriers
UFC 4-022-03	Security Fences and Gates

G20 1.2 QUALITY ASSURANCE

G20 1.2.1 Qualifications of Tree Location Contractor

Contractor is required to be a professional tree moving company holding Landscape Contractor's license in the state where the work is to be performed and have a minimum ten years of tree relocation experience. Contractor must be a Certified Arborist certified by the International Society of Arboriculture. Arborist is required to oversee all tree moving operations during construction.

G20 1.2.2 Qualifications of New Landscape Contractor

Construction company must hold a Landscape Contractor's license in the state where the work is to be performed and have a minimum five years of landscape construction experience.

G20 1.3 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Compliance with the requirements will be determined by a review of the design and construction submittals and by field inspection. See Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, and Part 2 Section 01 33 00.05 20, *Construction Submittal Procedures*, for additional requirements.

Verify satisfactory performance via Performance Verification, as detailed in this section of the RFP. Verify satisfactory performance also via testing as detailed in the paragraph, Field Quality Control, in UFGS

Specification Sections utilized.

G20 1.3.1 Subgrade Preparation Performance Verification

Perform subgrade preparation in accordance with PTS Section G10. If required by the Designer of Record, perform proof rolling. Perform proof rolling in the presence of the Contracting Officer. Rutting or pumping of material is required to be undercut and replaced with satisfactory soil materials as defined in Section G10, *Site Preparation*.

G20 1.3.2 Base Course Performance Verification

G20 1.3.2.1 Aggregate Base Course

a. Sampling: ASTM D75/D75M.
b. Gradation: ASTM C136.
c. Thickness: Confirm in-place compacted thickness. Acceptable tolerances are plus or minus 0.5 inches (13 mm). One test for every 500 square yards (418 square meters); minimum 2 tests.
d. Density: ASTM D1556 or ASTM D6938. One field test for every 1000 square yards (836 square meters); minimum 2 tests. ASTM D1557, Method A, B or C; one laboratory test for the project.
e. Visual: Provide smooth surface with no ruts.

G20 1.3.2.2 Other Types of Base Courses

For other types of base courses, provide field testing in accordance with the SHS.

G20 1.3.3 Bituminous Concrete Pavement Performance Verification

- Visual: Provide finished surface that is uniform in texture and appearance and free of cracks and creases.
- Sampling: ASTM D979.
- Job Mix: Determine gradation and bitumen content. One sample for every 400 tons (362,500 kilograms); minimum 1 test.
- Thickness: ASTM D3549. Confirm in-place compacted thickness. Acceptable tolerances are plus or minus 0.5 inches (13 mm) for bituminous base course and plus or minus 0.25

inches (6 mm) for bituminous surface course. One test for every 500 square yards (418 square meters); minimum 2 tests.

- Surface Smoothness: Test surface smoothness by using a 10 foot (3 meter) straightedge in transverse and longitudinal directions to pavement. Acceptable tolerances are plus or minus 0.25 inches (6 mm) for bituminous base and surface courses.
- Density: Conduct field density of in-place compacted pavement in accordance with ASTM D2950 and correlated with ASTM D1188 or ASTM D2726/D2726M. One field test for every 1000 square yards (836 square meters); minimum 2 tests. One laboratory test for the project.

G20 1.3.4 Portland Cement Concrete Pavement Performance Verification

- Visual: Provide finished surface that is uniform in texture and appearance and free of cracks.
- Sampling: ASTM C31/C31M.
- Thickness: Acceptable tolerances are plus or minus 0.5 inches (13 mm). One test for every 500 square feet (418 square meters); minimum 2 tests.
- Surface Smoothness: Test surface smoothness by using a 12 foot (3.6 meter) straightedge in transverse and longitudinal directions to pavement. Provide finished surfaces of the pavements with no abrupt change of 0.71 inch (18 mm) or more.

- Strength: Samples for strength tests of each mix design of concrete placed each day are required to be taken not less than once a day, nor less than once for each 100 cubic yards (120 cubic meters) of concrete, nor less than once for each 5000 square feet (500 square meters).

  1) Compressive Strength: ASTM C39/C39M. Make five test cylinders for each set of tests. Test two cylinders at 7 days, two cylinders at 28 days, and hold one cylinder in reserve. Determine each strength test result by the average of two cylinders from the same concrete sample tested at 28 days. If the average of any three consecutive strength test results is less than f'c or if any strength test result falls below f'c by more than 500 psi, take a minimum of three ASTM C42/C42M core samples from the in-place work represented by the low test cylinder results and test. Consider the concrete represented by core test structurally adequate if the average of three cores is equal to at least 85 percent of f'c and if no single core is less than 75 percent of f'c. Retest locations represented by erratic core strengths.

  2) Flexural Strength: ASTM C78/C78M. Make four test specimens for each set of tests. Test two specimens at 28 days, and the other two at 90 days. Concrete strength

will be considered satisfactory when the minimum of the 90-day test results equals or exceeds the specified 90-day flexural strength, and no individual strength test is less than the design strength. If the ratio of the 28-day strength test to the specified 90-day strength is less than 65 percent, make necessary adjustments for conformance.

- Remove concrete not meeting strength criteria and provide new acceptable concrete at no expense to the Government. Repair core holes with nonshrink grout. Match color and finish of adjacent concrete.

G20 1.3.5 Concrete Joint Performance Verification

Install a test section of 500 linear feet (150 m) at start of sealing operation for each sealant to be used. Obtain approval of test section by Contracting Officer prior to installing additional joint seal. Reject joint sealer that fails to cure properly, or fails to bond to joint walls, or reverts to uncured state or fails in cohesion, or shows excessive air voids, blisters, or has surface defects, swells, or other deficiencies, or is not recessed within indicated tolerances. Remove rejected sealer and reclean and reseal joints.

G20 1.3.6 Topsoil Performance Verification

Prior to planting design, provide a commercial soil analysis. Amend planting areas based on the soil test's interpretation, amendment type, and quantity recommendations (including soil nutrients and texture, with percentages shown). Use additional topsoil only in areas where soil analysis shows that the existing soil is inadequate for growth of plant materials.

G20 1.3.7 Final Inspection for Planting and Irrigation

Request the final inspection in writing at least 10 days prior to the last day of the planting and irrigation Establishment Period. The Landscape Contractor must attend the inspection with the Contracting Officer and document the inspection. The Landscape Architect-of-Record must also attend the inspection and provide the Contracting Officer with a letter certifying that the planting and irrigation is installed per the plans and irrigation coverage is correct and appropriate for optimum plant survival. At the end of the Establishment Period, remove stakes and guy cables.

G20 1.3.8 Landscape and Irrigation Establishment Period and Guarantee

Guarantee transplanted trees, newly planted vegetation and irrigation systems for a period of one year after the Contracting Officer's final acceptance. This acceptance, and the submittal of irrigation as-builts and controller charts, begins the Establishment Period. Replace trees, shrubs, and ground covers that die or have 20 percent or more of their crowns that die during planting operations or the guarantee period with healthy plants of the same species or variety during the appropriate planting season. The Landscape Architect-of-Record must, along with the Contracting Officer, attend, approve and document the start of the Establishment Period and document quarterly and final inspections. The Landscape Architect of Record must document quarterly and final inspections by submitting written reports with photographs to the Contracting Officer. During this period, perform tasks including, but not limited to: watering, mowing, overseeding, fertilizing, mulching, pruning, weeding, eradicating pests (rodents, rabbits, insects, mammals and fungus), restaking, adjusting guy wires, adjusting irrigation systems, maintaining erosion control materials, removing dead or broken branches by pruning in accordance with ANSI A300 Part 1, maintaining edging of planter beds, checking for girdling of trees, removal of trash and debris, and replenishing mulch to assure plant material is in a healthy and thriving condition or replace plant material at Contractor's expense. Reseed broadcast seeded or hydro-seeded areas that do not achieve the 95-percent coverage by the end of the Establishment Period by the same method and maintain an additional 120 days to ensure coverage requirements are met. Maintain turf in a manner that promotes proper health, growth, rich natural green color, and a neat, uniform, manicured appearance, free of bare areas, ruts, holes, weeds, pests, dead vegetation, debris, and unwanted vegetation that present an unsightly appearance. Mow weekly during the growing season and remove excess clippings.

G20 1.4 DESIGN SUBMITTALS

Submit design submittals in accordance with UFC 1-200-01, *DoD Building Code*(*General Building Requirements)*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, FC 1-300-09N, *Navy and Marine Corps Design Procedures*, and UFC 3-201-01, *Civil Engineering*.

In addition, UFGS sections listed below or in the body of the PTS text are to be used by the Designer of Record (DOR) as a part of the design submittal. If the UFGS products or systems are applicable to the project, the DOR is required to edit these referenced UFGS sections and submit them as a part of the design submittal specification. Edit the specification sections in accordance with the limitations stated in PTS Section Z10, *General Performance Technical Specifications*.

32 11 20, *[Base Course for Rigid][and][Subbase] [Select-Material] [for Flexible Paving]*

32 11 33.13, *Portland Cement-Stabilized Base Courses*

32 11 36.13, *Lean Concrete Base Course*

32 12 16.16, *Road-Mix Asphalt Paving*

32 13 13.06, *Portland Cement Concrete Pavement for Roads and Site Facilities*

32 13 43, *Pervious Concrete Paving*

32 14 13.13, *Interlocking Precast Concrete Unit Paving*

Provide sustainability submittals in accordance with Part 2 Section 01 33 29, *Sustainability Requirements and Reporting*.

G20 1.5 CONSTRUCTION SUBMITTALS

Submit a transplanting plan for projects which include transplanting trees. Submit the plan showing existing and proposed locations of transplanted trees. Include in the plan delineate methods and times for root pruning, digging, balling, removing, storing, transporting, planting, watering, and maintenance to ensure survivability. Include also in the plan equipment, anti-desiccant, and pesticides to be used. Provide a listing of the plant material to be transplanted by common name and botanical name as listed under "Nomenclature" in ANSI Z60.1; classification; caliper; and height.

Provide sustainability submittals in accordance with Part 2 UFGS Section 01 33 29, *Sustainability Requirements and Reporting*.

G20 1.5.1 Transplanting Plan

Submit a transplanting plan for projects which include transplanting trees. Submit the plan showing existing and proposed locations of transplanted trees. Include in the plan delineate methods and times for root pruning, digging, balling, removing, storing, transporting, planting, watering, and maintenance to ensure survivability. Include also in the plan equipment, anti-desiccant, and pesticides to be used. Provide a listing of the plant material to be transplanted by common name and botanical name as listed under "Nomenclature" in ANSI Z60.1; classification; caliper; and height.

G20 1.5.2 As-Builts

Submit a complete set of irrigation as-builts to the Contracting Officer, to include the recording of measurements onto a record set of full-size project irrigation plans. Indicate measurements for locating water meters, pressure supply lines at 100 foot (30 m) intervals, backflow prevention devices, rain/freeze sensors, valves (including quick couplers and hose bibbs), controllers (and control wire, if routed separately from pressure supply line); dimensioned from two permanent points of reference, such as building corners, sidewalks, and other permanent features.

G20 1.6 ANTITERRORISM (AT) STANDARDS

Incorporate the minimum AT standards indicated in UFC 4-010-01, *DoD Minimum Antiterrorism Standard for Buildings*.

G20 1.7 PROJECT LIMITATIONS

Prior to the start of design, determine the exact limit-of-work line for the project periphery, considering items such as, but not limited to, utility work, landscape areas, and laydown areas. See PTS G2050 for limits of landscape areas.

G2010 ROADWAYS

G2010 1.1 PAVEMENT DESIGN

Provide geometric and pavement design, including minimum pavement sections, in accordance with UFC 3-201-01, *Civil Engineering*, and the State Department of Transportation. Provide pavement calculations in accordance with FC 1-300-09N, *Navy and Marine Corps Design Procedures*. Provide any required additional pavement design to provide a complete and useable facility.

For pavements subject to aircraft traffic or aircraft ground support equipment traffic consult Government Civil Reviewer for design criteria and requirements. State Department of Transportation standards are not acceptable for airfield pavements.

G2010 1.2 PAVEMENT AESTHETICS

Provide surfaces consistent in color and finish.

G2010 1.3 LANDSCAPING

Include adequate space for trees and other landscape material in the design for streets, roads, and parking lots in accordance with PTS G2050.

G2010 1.4 TRAFFIC CONTROL DEVICES

Provide and install new traffic control devices (i.e., signs and markings) in accordance with the United States Department of Transportation Federal Highway Administration's *Manual on Uniform Traffic Control Devices* and their standard, "Rigid Sign Supports". Also provide new traffic control devices along/in the existing streets adjacent to the project site as necessary to provide complete traffic control to the new facilities.

G2010 1.5 EXISTING UTILITY STRUCTURES

Adjust existing utility structures to meet the new finished pavement grades as required.

G201001 BASES & SUBBASES

Prepare subgrade in accordance with Section G10, *Site Preparation*. Use geotextiles for separation or reinforcement in accordance with manufacturer's instructions. Provide base course under paved areas in accordance with the State Highway specifications (SHS) in the state where the project is located.

Place base course in accordance with the SHS for that particular base course and in layers of equal thickness with no compacted layer more than 6 inches (150 mm) thick. Compact base course at optimum moisture content to 100 percent ASTM D 1557 maximum dry density.

Where SHS are not available or applicable, the Designer of Record must utilize

the UFGS Specification Sections referenced under paragraph 1.1.2 entitled "Government Standards" for the project specification. Submit these specifications in edited form as a part of the design submittal for the project.

G201002 CURBS & GUTTERS

Provide concrete curbs and gutters in accordance with the SHS and standards or as specified in UFC 3-201-01, *Civil Engineering*, whichever is more stringent. Where the SHS do not include concrete materials for curbs and gutters, provide concrete in accordance with the standard mix of the SHS for a minimum compressive strength at 28 days of 3500 psi (25 MPa) concrete.

G201003 PAVED SURFACES

Where SHS are not available or applicable, the Designer of Record must utilize the UFGS Specification Sections referenced under paragraph 1.1.2 entitled "Government Standards" for the project specification. Submit these specifications in edited form as a part of the design submittal for the project.

G201003 1.1 PAVEMENT MIX

G201003 1.1.1 Bituminous Concrete Pavement

Provide bituminous concrete pavement in accordance with the standard mix of the SHS based on the pavement design and vehicle loading indicated in this RFP.

G201003 1.1.1.1 Bituminous Concrete Placement

Provide bituminous concrete placement, including minimum temperature during placement, joints, and maximum lift thickness in accordance with the SHS. Compact bituminous concrete in accordance with the SHS, modified to 96 percent of maximum laboratory density.

G201003 1.1.2

G201003 1.1.3 Portland Cement Concrete Pavement

If reinforced, provide the welded wire fabric in conformance to ASTM A185. Provide bar reinforcement in conformance to ASTM A615/A615M, Grade 400 (Grade 60).

Provide concrete in accordance with the standard mix of the SHS for the design strength required by UFC 3-201-01, *Civil Engineering*, plus allowable deviations. Unless noted otherwise in Part 3 or Part 6, provide a minimum compressive strength at 28 days of 3500 psi (25 MPa) concrete.

If required for sustainability goal, provide Portland cement concrete pavement with a Solar Reflectance Index (SRI) greater than or equal to 29.

G201003 1.2 JOINTS FOR PORTLAND CEMENT CONCRETE PAVEMENT

Provide joints in accordance with SHS and UFC 3-250-01, *Pavement Design for*

Roads and Parking Areas. Install joints in a manner and at such time to prevent random or uncontrolled cracking. Locate joints to form a regular rectangular pattern. Wherever curved pavement edges occur, make joints to intersect tangents to curve at right angles.

G201003 1.2.1 Expansion Joints

Provide thickened edge expansion joints at the intersection of two rigid pavements. Use preformed joint filler, ASTM D1751. Provide filler that is compatible with joint sealer material. Hold preformed joint filler in position during concreting operations.

G201003 1.2.2 Isolation Joints

Provide thickened edge isolation joints by placing a 1/2-inch (12 mm) preformed joint filler (ASTM D 1751) around each structure that extends into or through the pavement before concrete is placed at that location.

G201003 1.2.3 Contraction Joints

Saw joint lines within specified tolerance, straight, and extend for width of transverse joint, and for entire length of longitudinal joint.

G201003 1.2.4 Construction Joints

If an emergency stop occurs remove the concrete back to location of transverse joint and install a construction joint.

G201003 1.2.5 Joint Sealants

ASTM D5893/D5893M; provide single component cold-applied silicone. Provide a self-leveling and non-acid curing silicone sealant.

G201003 1.2.6 Preformed Compression Seals

Use preformed compression seals in areas where silicone joint sealant does not perform, such as areas subject to water inundation, blasts, or constant/repeated fuel spillage.

ASTM D 2628. ASTM D 2835, for lubricant.

G201003 1.3 PRIME COAT

Use prime coat in accordance with the SHS. Use emulsified asphalt for prime coat materials.

G201003 1.4 TACK COAT

Tack coat is required for bituminous pavement overlays and on vertical cut faces of pavement patches. Provide tack coat in accordance with the SHS.

G201003 1.5 PAVEMENT PATCHES

Provide pavement patches for existing pavements where required for

installation of utility trenches. Sawcut 12 inches beyond edge of trench. Provide thicknesses of pavement materials equal to or greater than the existing pavement section.

For spalls or repairs of existing concrete pavement, perform repairs in conformance with UFC 3-270-03, *Concrete Crack and Partial Depth Spall Repair*, and UFC 3-270-04, *Concrete Repair*. Provide spall repair materials that are either Rapid Setting Cementitious Concrete (RSCC), epoxy concrete, or polymer-modified Portland Cement (non-sag mortar) products specially formulated for spall repairs, with a proven record (in service at least three years) of satisfactory use under loading and environmental conditions similar to those at the location of intended use. Provide a manufacturer's data sheet and certificate supporting the satisfactory use to the Contracting Officer with the design. A product manufacturer's representative is required to be present during the initial two days of product application to verify that manufacturer's instructions for use are adhered to by the Contractor. Give the Contracting Officer 7 days notice prior to the initial application in order to be present.

G201004 MARKING & SIGNAGE

G201004 1.1 MARKING

Provide pavement markings in accordance with the SHS. Design materials for life expectancy of at least 3 years under an average daily traffic count per lane of approximately 9000 vehicles. Water based paints must have durability rating of at least 4 when determined in the wheel path area.

Provide a half-rate initial marking application on bituminous pavements. Provide the remaining application at the end of the normal curing period.

G201004 1.2 SIGNAGE

Provide signage in accordance with the Manual on Uniform Traffic Control Devices (MUTCD).

G201005 GUARDRAILS & BARRIERS

G201005 1.1 GUARDRAILS

Provide guard (guide) rails in accordance with the SHS. Where the SHS do not include materials for guardrails, provide guardrails in accordance with the *AASHTO Roadside Design Guide*.

G201005 1.2 BOLLARDS

For bollards to prevent damage, provide minimum 4 feet height, 4 inch diameter steel pipe filled with concrete, painted, and embedded in a portland cement concrete foundation.

For bollards located at building entries or other high-visibility areas provide decorative bollards matching the design of the facility or consistent with the Base Exterior Architecture Plan (BEAP) and the Installation Appearance Plan.

Bollards for security are specified in Section G204004, "Security

Structures".

G201006 RESURFACING

Adjust rims of existing utility structures to match proposed grades after resurfacing.

G201006 1.1 SLURRY SEAL

ASTM D 3910 and in accordance with the SHS.

G201006 1.2 BITUMINOUS CONCRETE OVERLAY

Remove old pavement by cold milling to depths required to provide new surface and leave underlying materials intact. Clean the pavement of excessive dirt, clay or other foreign matter with power brooms and hand brooms immediately prior to the milling operation.

Repair or replace damaged utility structures, valve boxes, or pavement that is torn, cracked, gouged, rutted, broken or undercut at no additional expense to the Government.

Provide bituminous concrete overlay produced from hot or cold recycling of the milled material or from virgin materials in accordance with the provisions of UFC 3-201-01, *Civil Engineering*, and the standard mix of the SHS based on the pavement design and vehicle loading as indicated in this RFP.

G201006 1.3 CRACK SEALING

Use fiber reinforced crack sealer for sealing cracks in asphalt pavement after milling and prior to resurfacing. Provide crack sealing conforming to the following requirements in UFC 3-270-01, *Asphalt Maintenance and Repair*, and UFC 3-270-02, *Asphalt Crack Repair*.

G2020 PARKING LOTS

Refer to Section G2010.

G2020 1.1 PERMEABLE PAVEMENT

Provide permeable concrete pavers of solid interlocking paving units complying with ASTM C936, resistant to freezing and thawing when tested according to ASTM C67, and made from normal-weight aggregates. If required for sustainability goal, provide permeable concrete pavers with a Solar Reflectance Index (SRI) greater than or equal to 29.

Provide pervious concrete in accordance with UFGS Section 32 13 43, *Pervious Concrete Paving*.

Do not use asphalt-surfaced porous pavement.

G202001 BASES & SUBBASES

Refer to Section G201001.

G202002 CURBS & GUTTERS

Refer to Section G201002.

G202003 PAVED SURFACES

Refer to Section G201003.

G202004 MARKING & SIGNAGE

Refer to Section G201004. Provide water-based paints only.

Mark to denote traffic lanes and parking spaces; mark in accordance with the requirements of UFC 3-201-01, *Civil Engineering*.

G202005 GUARDRAILS & BARRIERS

Refer to Section G201005.

G202005 1.1 WHEELSTOPS

Provide precast concrete wheelstops.

G202006 RESURFACING

Refer to Section G201006.

G2030 PEDESTRIAN PAVING

Locate new sidewalks such that they maintain continuity of pedestrian traffic to and from the existing sidewalks adjacent to the site(s).

G203001 BASES & SUBBASES

Provide as required by local standards or geotechnical report; refer to Section G201001.

G203003 PAVED SURFACES

G203003 1.1 SIDEWALKS

Provide sidewalks of Portland cement concrete pavement with 4 inches (100 mm) thick minimum or permeable pavement. Provide concrete and permeable pavement in accordance with Section G201003 and G2020, respectively. For PCC sidewalks, provide a broomed finish. Provide sidewalks of at least 5 feet (1.5 meters) wide, except that sidewalks connecting entry points of housing units to the housing unit's parking are required to be at least 36 inches (900 mm) wide. In housing areas, offset sidewalks paralleling streets to maintain a minimum grassed separation of 5 feet (1.5 meters) from the back face of the curb to the closest edge of the sidewalk.

Unless indicated otherwise, provide a transverse slope of 1/48. Limit variation in cross section to 0.25 inch in 5 feet (6 mm in 1.50 m).

Submit samples boards in accordance with ESR G2050 and PTS G2050 and finish schedule on final plans.

G203003 1.1.1 Joints for PCC Pavement Sidewalks

Provide contraction joints spaced at intervals equivalent to the width of the sidewalk. Provide 0.5 inch (13 mm) thick transverse expansion joints at changes in direction where sidewalk abuts curb, steps, rigid pavement, or other similar structures; space expansion joints every 50 feet (15 m) maximum. Provide isolation joints by placing a 1/2-inch (12 mm) preformed expansion joint filler around each structure that extends into or through the sidewalk before concrete is placed at that location.

G203003 1.2 CONCRETE PAVERS

G203003 1.3 HANDICAPPED RAMPS

Provide handicapped ramps of PCC pavement with an exposed aggregate finish, truncated domes, or as required by the SHS at roadway intersections.

G203004 GUARDRAILS & BARRIERS

Refer to Section G201005.

G2040 SITE DEVELOPMENT

G204001 FENCING & GATES

G204001 1.1 CHAIN LINK FENCE

Provide chain link fence designated as security fencing in accordance with paragraph G204001 - 1.3.

Provide chain link fence fabric that is at least 9 gauge (3 mm) steel wire mesh material (before coating) with mesh openings not larger than 2 inches (51 mm). Do not use aluminum fabric, posts or accessories. Install fence in accordance with ASTM F567 and the manufacturer's written installation instructions.

G204001 1.1.1 Tensions Wires and Top Rails

Provide rails in accordance with FS RR-F-191/3, Class 1, steel pipe, Grade A.

G204001 1.1.2 Gates

Provide gates in accordance with FS RR-F-191/2 with posts and fabric as specified for fence.

G204001 1.1.3 Posts and Braces

Provide posts and braces in accordance with FS RR-F-191/3, Class 1, steel pipe, Grade A. Brace each gate, terminal and end post with truss rods.

G204001 1.1.4 Fencing Accessories

Provide fencing accessories in accordance with FS RR-F-191/4. If PVC

coating is required, provide accessories with PVC color coating similar to that specified for chain-link fabric or framework.

G204001 1.2 ORNAMENTAL FENCE

G204001 1.3 SECURITY FENCE

Provide security fencing systems in accordance with UFC 4-022-03, *Security Fences and Gates*, and this RFP.

G204001 1.3.1 Chain Link Security Fence

Provide chain link fence in accordance with paragraph G204001 - 1.1, excepted as noted otherwise. Ensure that the fabric has twisted and barbed selvage at the top and bottom. Do not provide top rails. Locate posts and structural supports on the inner side of the fencing. Install outriggers facing outward except when the fence is mounted directly on the property line.

G204001 1.3.2 Signage

Provide signage at a minimum of 200 foot (61 m) intervals along the entire perimeter.

G204001 1.3.3 Drainage Culverts and Utility Openings

Provide protective measures to prevent access through culverts, storm drains, sewers, air intakes, exhaust tunnels and utility openings or across drainage ditches or swales in accordance with UFC 4-022-03.

G204001 1.4 OPENINGS IN PERIMETER AND SECURITY FENCING

Do not cover, block or lace openings in perimeter fencing and security fencing with material which would prevent a clear view of personnel, vehicles or material in the outer or inner vicinity of the fence line.

G204001 1.5 FENCE GROUNDING

Ground and bond the fence in accordance with the National Electric Safety Code (NESC) - IEEE C2 and UFC 4-022-03. Ground fencing on either side of every gate and at other locations when the fencing is near and parallel to high tension power lines. Grounding is also required at intervals of 1000 feet (305 meters) to 1500 feet (457 meters) when the fencing runs through isolated areas and at lesser distances depending on the proximity of the fencing to public roads, highways and buildings where the fencing is around or within explosive storage, production, operating or handling areas.

G204001 1.6 ENCLOSURES FOR UTILITY EQUIPMENT

Where fencing is used to provide an enclosure for utility equipment, ensure a minimum clearance is provided no less than 3 feet (900 mm) around the equipment to permit maintenance access and ventilation. Provide stone, gravel or concrete paving within the enclosure.

G204002 RETAINING WALLS AND FREESTANDING WALLS

Provide retaining walls to permanently resist soil pressures as well as live loads. Provide wall drainage to minimize lateral loading and protect wall materials against degradation.

G204003 EXTERIOR FURNISHINGS

Refer to ESR G20 and other portions of the RFP for exterior furnishings required on this project. Permanently attach all site furnishings to concrete pads. Provide site furnishings in conformance with the Base Exterior Architecture Plan (BEAP) and or Installation Appearance Plan for each Activity. If no product guidance is given, coordinate material, finish and color with architecture (fiberglass and aluminum are not acceptable) and provide to the greatest extent possible, materials with industrial recycled content, preferably from regionally local manufacturers.

G204003 1.1 PICNIC AND PASSIVE RECREATION AREAS

Include tables, with attached benches, on concrete bases sloped to drain and permanent barbecue grill(s) for picnic areas. Additionally, provide separate receptacles for trash, recycling and barbecue ashes. Permanently attach site furnishings to concrete paving extending a minimum of 12 inches (300 mm) past the furnishing, with the exception of picnic tables and benches, which require concrete paving extending 2 feet (600mm) minimum on all sides. Set the elevation of the finished concrete plus 1 inch (25 mm) above adjacent grade.

G204003 1.2 TRASH RECEPTACLES

Provide trash receptacles with drain hole and stationary or self-closing lids with anchor chains secured to the receptacle to protect the contents from weather. Design receptacles to hold heavy-duty plastic or galvanized steel liners of the same manufacturer. Consider potential weight of full containers when deciding on 'top loading' or 'side loading' receptacles. Include a concrete pad 12 inches (300 mm) larger on all sides than the size of the trash receptacle base.

G204003 1.3 BENCH

Minimum 6 feet (1.8 meter) length to match trash and recycling receptacle material & color, installed a minimum of 18 inches (450 mm) above finish grade, permanently installed with anchor bolts or in-ground. For benches located in nonpaved areas, provide concrete pads extending a minimum 2 feet (0.6 meters) beyond the edge of the seat portion of the bench (or both front and back if accessible from either).

G204003 1.4 RECYCLING RECEPTACLES

Provide recycling receptacles, single-piece with separate slots for cans, bottles, newspaper. Match height, material, and style of the trash receptacle.

G204003 1.5 BARBEQUE

Minimum 12 inches (300 mm) x 18 inches (450 mm) with heavy-duty grill and hinged stainless steel lid, factory primed and painted with rust-resistant paint. Install so coal height is a minimum of 36 inches (0.91 meter) above

finish grade.

G204003 1.6 HOT ASH RECEPTACLE

Minimum 28 square inches (181 square centimeters) x 42 inches (1.1 meter) high pre-cast reinforced concrete with drain hole with steel ash grate and cast in "Hot Coals Only" logos on each side with white letters on a red background.

G204004 SECURITY STRUCTURES

Where identified for project elsewhere in this RFP, provide active and passive vehicle barriers to effectively stop or detect penetration by explosive-laden vehicles through the perimeter of a protected area in accordance with UFC 4-022-02, *Selection and Application of Vehicle Barriers*. When vehicle barriers are included in the project, refer to Part 5 of the RFP for additional requirements.

G204005 SIGNAGE

Provide facility signage in accordance with local code, the Installation and Appearance Guide, the Base Exterior Architectural Plan (BEAP) and this RFP.

Size messages and graphics on signs according to the functional viewing distance. Typically, at least 1 inch (25 mm) of letter height per 25 feet (7.62 meters) of viewing distance is required for readability.

Refer to Section G201004, "Marking & Signage" for traffic signage.

G204007 PLAYING FIELDS

G204007 1.1 PLAYGROUNDS

Design playgrounds and provide surfacing and equipment in accordance with this RFP and U.S. Consumer Products Safety Commission Publication 325 and ASTM F1487. Border tot-lots and play-lots with reinforced concrete curbing to a depth appropriate to the safety surfacing utilized. Provide shade and wind protection where these elements may significantly limit the use of the facilities. For tot-lots and play-lots provide separated areas with appropriately sized equipment and materials to serve their developmental levels. Separate areas by a buffer zone, which can be an area of shrubs, hardscape or benches. Provide signage to give guidance to adults as to the age appropriateness of the equipment.

G204007 1.1.1 Tot Lots

Design each "tot lot" to accommodate children from ages 2 through 5 to provide a variety of play activities and motor skill development opportunities which include, as a minimum:

For multi-activity structures provide a minimum of two platforms and two slides, one wheel chair accessible, swing set for young children, paired spring mounted 'riders' or other similar apparatus. Locate at least two benches with backs on concrete bases for convenience to, and observation of, the tot-lot.

G204007 1.1.2 Play Lots

Design each "play lot" to accommodate children from ages 5 to 12 to provide a wider range of activities and opportunities for greater motor skills development and improvement. These include, as a minimum:

For a multi-activity structure, provide a minimum of three platforms and two slides, one wheel chair accessible. A swing set, or other similar apparatus. Locate at least two benches with backs on concrete bases for convenience to, and observation of, the play-lot.

G204007 1.1.3 Equipment

Provide tot lot and play lot equipment that is factory finished institutional quality, in compliance with ASTM F1487, the United States Consumer Products Safety Commission's *Guidelines for Public Playgrounds*, and the UFC 3-201-01, *Civil Engineering*. Use only equipment that has been approved by International Play Equipment Manufacturers Association (IPEMA) and installed by a National Playground Contractors Association (NPCA) Contractor.

Site tot lot and play lot equipment to provide use and no encroachment zones in accordance with ASTM F1487. A use zone is a clear, unobstructed area under and around play equipment where a child would be expected to land when jumping or falling from a piece of play equipment. Requirements for use zones vary for the age group and for different pieces of equipment. Show all use zones for play equipment on the site plan to ensure there is no conflict between play activities on the ground and swinging or jumping from the equipment. The No-encroachment zone is an additional area beyond the use zone where children using the equipment can be expected to move about and should have no encroaching obstacles. This area varies according to the types of adjacent equipment, and their orientation to one another.

G204007 1.1.4 CCA-Treated Lumber

Do not use chromated copper arsenate (CCA) treated lumber in recreational facilities for children.

G204007 1.1.5 Playground Safety Surface

Provide a playground safety surface, in accordance with ASTM F355 and ASTM F1292, throughout use zones and under play equipment in tot lots and play lots. Natural wood products and decomposed granite are not allowed for surfacing. Loose fill surfacing must be a minimum of 4 inches (100 mm) below the top of edging. Consider local climate, soil conditions, location and size of area, type of activity, age of users, and intensity of use when choosing surfacing material. Provide soil separator fabric between playground loose-fill material and subgrade soil. Design play areas with permeable surface and adequate drainage. Drain to sump a minimum of 20 feet out from the playground curbing or to storm drain.

G204007 1.2 PLAYING FIELDS

Provide playing surfaces in accordance with this RFP. Use synthetic turf systems approved by the reviewing Government Landscape Architect or Civil

Engineer.

G204090 OTHER SITE IMPROVEMENTS

Provide other site improvements in conformance to the BEAP or Installation Appearance Plan and to the requirements of UFC 4-010-01.

G204090 1.1 DUMPSTER PADS AND ENCLOSURES

Provide 200 mm (8 inch) thick non-reinforced portland cement concrete pavement dumpster pads sized larger than what is required to accommodate the specific dumpsters to be used at the site. Make the concrete pad large enough to accommodate the front wheels of the carrying truck.

Select the dumpster enclosure's materials and style to complement the adjacent buildings and facilities. Provide walls be at least 1.83 meters (6 feet) in height. Where possible, orient the openings of enclosures away from building entrances and main streets.

G2050 LANDSCAPING

Landscape area is defined as permeable areas within the project boundaries not covered by buildings, roads, parking lots, sidewalks, and other non-permeable areas. Provide landscape improvements to all site areas disturbed by construction.

G2050 1.1 DESIGN

Design landscaped areas in accordance with Presidential Executive Order 13148 of April 2000, with a goal to reduce fertilizers, pesticides, and water use. The intent is to achieve a base-wide ratio of 20 percent maximum non-native plants and 80 percent minimum locally or regionally native plants. Do not use plants deemed invasive by the project state or region's Exotic Pest Plant Council, State Department of Agriculture or local chapter of the American Society of Landscape Architects as a threat to ecosystems or agriculture. Select only plant species which require little or no supplemental irrigation after the initial establishment period. Only nursery-grown plants are acceptable. Cover non-paved site areas disturbed by construction operations with plant material or inorganic mulch. Stabilized soil, decomposed granite, and organic mulch are not acceptable as ground covers. Provide landscape architectural work in accordance with UFC 3-201-02, *Landscape Architecture*. For projects with planting or irrigation areas, utilize the design services of a Landscape Architect licensed in the state of the project. The Landscape Architect of Record must visit the site at least once prior to design, twice during construction, and quarterly during the Establishment Period, including the Establishment Period start and completion. The Landscape Architect of Record must attend the kickoff partnering meeting and CDWs. Courtyards and plazas are to be designed by the Landscape Architect. For the CDW, provide a Site Analysis Plan to demonstrate the design thought process. It is the Contractor's responsibility to coordinate between disciplines including architecture, civil engineering, electrical engineering, mechanical engineering, fire protection, and landscape architecture. Coordinate location of utilities, structures, and equipment. For projects in dry climates (arid and semi-arid), eliminate or minimize the use of turf, except when needed for active or passive recreation.

The Landscape Architect-of-Record is required to submit 5 sample boards of landscape materials. Sample boards to include but not limited to colors, finishes, textures of hardscape paving, walls, signs, monument piers, inorganic mulches, organic mulches, and other site improvements. Include cut sheets of proposed plant material.

G205001 FINE GRADING AND SOIL PREPARATION

See Section G10, *Site Preparation*. Provide 4 inches (102 mm) of topsoil with appropriate soil amendments, as recommended by a current soil composition test, for areas to be planted with turf grass.

G205002 EROSION CONTROL MEASURES

See Section G10, Site Preparation.

G205003 TOP SOIL AND PLANTING BEDS

See paragraph titled, G205005 PLANTINGS.

G205004 SEEDING, SPRIGGING, AND SODDING

Hydroseed areas that are to be seeded and are larger than 1,000 square feet (92.90 square meters). Select hydroseed mix composition that is appropriate for surrounding land use and compatible and consistent with local application rates, seed availability and established practice in the project area. If project dates are unknown, specify required planting dates or alternative species for different seasons. Apply seed at a time best suited for germination of the selected species. Seeded areas are required to achieve a 95-percent coverage of the selected species and be weed free at the end of the Establishment Period.

G205005 PLANTINGS

G205005 1.1 EXISTING PLANT MATERIAL TO REMAIN OR BE TRANSPLANTED

Preserve existing trees to the greatest extent possible. Identify preserved trees on the plans with tree species, caliper and dripline. Tag trees to be saved with plastic or vinyl tape tied to the tree caliper. Protect existing trees by fencing planting areas to remain from compaction and other damage with a barrier of metal poles a maximum 8 feet (2.4 meter) on center with plastic netting to a minimum of 10 feet (3.0 meter) radius from outside of the tree's trunk. Where tree drip lines are greater than 10 feet (3.0 meter) from the tree's trunk, locate barrier fencing at the drip line of the tree. Install signs on each Tree Protection Zone fence indicating that the barrier is not allowed to be taken down or moved without the participation of a Certified Arborist. Ensure that the details and specifications clearly state that none of the following activities occur within the tree protection barricade: driving, parking, storing materials, dumping waste, concrete washout, adding fill soil, trenching, removing soil, grubbing, or other disturbance to the tree or the associated roots. Do not allow debris from tree or stump removal operations to fall on or otherwise damage plants that are not scheduled for removal. Do not remove plastic tape and barrier fencing until planting operations are ready to begin and or instructed by the Contracting Officer. Replace existing trees to remain or to be transplanted that are unhealthy, that die, or have 20 percent or more of their crowns that die during the establishment period with healthy

plants of the same species or variety during the appropriate planting season. During the landscape establishment period, replace trees, turf, shrubs, and ground cover that are damaged or destroyed during construction operations by the Contractor at no additional cost to the Government. At the direction of the Contracting Officer, remove the existing tree and stump and replace it with trees of the same genus and species equal to the total caliper of the existing tree. Provide replacement trees that are 4 inch (100 mm) minimum caliper. Replace shrubs with 5 gallon (18.9 liter) size container, ground cover with flat containers planted at 8 inches (200 mm) on center, and turf with sod, all of the same genus and species.

G205005 1.2 UTILITIES

Do not place trees within 10 feet (3 meter) of above or below-grade utility line or structure. Within roadway sightlines, height of mature shrubs is limited to 3 feet (1 m) and trees must be limbed up a minimum of 6 feet (2 m) so their mature growth does not obstruct views from vehicle intersections or points of vehicle ingress or egress. Coordinate utilities between the Landscape Architect and appropriate disciplines.

G205005 1.3 RECYCLING

Green waste: Contact the Public Works Department for potential green waste collection and hauling by the Government. Separate green waste not collected by the Government from construction debris and deliver to the base's or local landfill's green waste recycling area. Quantify and report diverted waste to the Contracting Officer.

G205005 1.4 PLANTING

G205005 1.4.1 Plant Quantities

Provide trees at the minimum rate of one (1) tree per 1,000 square feet (92.9 square meters) of Landscape Area. Provide trees for parking areas at a minimum of one (1) tree per every 5 parking spaces around the parking perimeter and one (1) tree per every 10 parking spaces within the parking area. Provide a minimum of one (1) tree in each end aisle planter. Total minimum quantities may be reduced only by the reviewing Government Landscape Architect. Tree quantities reduced by the Government Landscape Architect will be included on the ADD/DEDUCT List by the Contracting Officer. For bioretention areas, provide minimum quantities of trees, shrubs, and ground covers in accordance with State regulations. Provide a minimum tree size of 24 inch (600 mm) box/2 inch (50 mm) caliper, or if within an anti-terrorism zone provide a minimum size of 36 inch (910 mm) box/3 inch (76 mm) caliper. For trees within concrete or other non-permeable paved areas, allow a minimum non-paved planting area of 4 feet by 8 feet (1.2 m by 2.4 m) per tree.

For dry climates (arid and semi-arid) only: Plant a minimum of 40 percent of the landscaped areas with shrubs and groundcover so that at 50 percent plant maturity, they form mass plantings. Utilize a minimum ratio of 60 percent 5 gallon (18.9 liter) shrubs or groundcover and 40 percent 1 gallon (3.79 liter) shrubs or groundcover. The remaining 60 percent of the landscape area may be inorganic mulch, planted or a combination thereof. For inorganic mulch, provide 3 inch

(76 mm) depth of 3/4-inch (19 mm) and smaller rock, and for larger than 3/4-inch (19 mm) size, assure complete ground surface coverage. Provide plant material calculation summary matrix on planting plan.

For other climate zones: Plant the majority of shrubs at major entrances to buildings and at other important planting zones that are specific to each site. The overall design intent is to plant mostly trees and turf, with shrubs and ground covers used sparingly, to reduce maintenance costs while still providing for functional planting requirements (e.g., soil stabilization, energy conservation, force protection, and aesthetics). Provide a minimum size 3 gallon (11.4 liter) container for shrubs and 1 gallon (3.79 liter) container for ground covers.

G205005 1.4.2 Plant Quality

Provide plants that comply with ANSI Z60.1 and ANSI A300, Part 1, current editions. Plants must be in a healthy, disease and pest free condition. Provide seed, sod, and sprigs that are State Certified.

G205005 1.4.3 Plant Selection

The reviewing Government Landscape Architect has final approval authority on selected plant material. Species deemed unsuitable for planting by the Government Landscape Architect will not be allowed.

G205005 1.4.4 Plant Installation

Perform planting operations, including but not limited to planting soil mixes and fertilization, in accordance with local established practices and agricultural extension service recommendations. Stake or guy new or transplanted trees with three stakes [2 inch x 2 inch x 8 feet (50 mm x 50 mm x 2.4 m) hardwood], or three guy cables [five-strand, 3/16 inch (5 mm) diameter galvanized steel cable]. Install linear tree root barriers at the edge of paving where trees are planted within 10 feet (3 m) of sidewalks, curbs, walls, columns, and other hard surface areas. Do not encircle tree root balls with root barriers.

G205005 1.4.5 Edging Materials and Mulching Materials

Provide 3/16 inch (5 mm) minimum thick by 5 inch (127 mm) minimum deep aluminum edging or 6 inch (150 mm) by 6 inch (150 mm) minimum, concrete edging dividing turf and planting beds and dividing planted and non-planted inorganic mulch areas. Provide stake type and spacing for aluminum edging per manufacturer's recommendations. Plastic edging is not allowed. Mulch planted areas not mulched with inorganic mulch with a 3-inch (75 mm) depth of organic shredded hardwood mulch. For inorganic mulch where rock cobble size is greater than half of the profile depth, provide Â¾ inch (19 mm) comparable color and shape rock mulch in bottom half of profile. For dry climates only, organic mulch must be shredded redwood bark unless approved otherwise by the reviewing Government Landscape Architect. Mulches (organic and inorganic) must not be subject to sloughing off on sloped sites. Submit samples of mulches to the reviewing Government Landscape Architect for approval prior to installation. Decomposed granite is

not allowed. Provide a 3-inch (75 mm) depth of organic shredded hardwood mulch between plants used to form a mass (in dry climates, mulch in the remainder of planting beds with inorganic mulch). Install mulching materials prior to the start of the Establishment Period.

G205005 1.4.6 Fertilizer

Fertilize transplanted trees, new trees, shrubs, ground covers, turf, perennials and ornamental grasses as recommended by local agricultural extension services.

G205005 1.4.7 Weed Fabric and Erosion Control Fabric

Provide a weed barrier fabric of sheet polypropylene or polyester fabric specifically designed for weed control purposes beneath planted or mulched non-planted areas. Treat fabric for protection against deterioration due to ultraviolet radiation. Provide fabric that is a minimum 99 percent opaque to prevent photosynthesis and seed germination from occurring, yet allowing air, water and nutrients to pass through to the roots. Minimum weight must be 5 ounces per square yard (0.11 kg per square meter) with a minimum thickness of 20 mils (0.50 mm) with a 20 year minimum guarantee. Provide a biodegradable product designed specifically for erosion control on sloped areas 3 (horizontal):1 (vertical) and steeper in slope. Do not place weed fabric over the root balls of trees.

G205005 1.4.8 Drainage

Provide for proper grading and drainage of turf and planting areas. Provide sub-surface drainage where soil or other conditions do not allow surface drainage. Do not drain roof gutters into planter areas.

G205007 IRRIGATION SYSTEMS

G205007 1.1 IRRIGATION

Where an irrigation system is required per other parts of this RFP, provide a permanent, below-grade system. Provide 100 percent sprinkler head to head coverage. Provide pop-up heads in turf and landscape zones when adjacent to walks, roads, parking lots, or in sparsely planted landscape areas where pedestrians may circulate. Provide pop-up heads project-wide on high-traffic sites such as, but not limited to, dining, housing, entertainment, daycare, education and recreation facilities. For dry climates, provide deep root watering systems for trees. Verify adequate water pressure for irrigation purposes and provide booster pumps and or pressure regulation as required. Provide minimum 18 inch (450 mm) cover over pressurized (mainline) PVC irrigation pipe and 12 inch (300 mm) cover over non-pressurized (lateral line) PVC irrigation pipe. 1/2-inch (13mm) pipe is not allowed. Provide pressurized (mainline) pipe in conformance with ASTM D1785, PVC 1120, Schedule 40. Provide non-pressurized (lateral) pipe in conformance with ASTM D2241, PVC 1120 SDR 21, Class 200. Test the entire system in the presence of the Contracting Officer and Landscape Architect-of-Record to ensure proper performance. Provide irrigation components that are commercial or institutional quality. Provide rain shut-off device and watertight splices. Provide sprinkler heads, bodies

and nozzles of the same manufacturer. Irrigation heads on the same valve must have nozzles with matched precipitation rates.

G205007 1.2 OPERATION AND CONTROL

Assure systems automatically operate on an "irrigation window" between 2000-0530. Provide compatible and fully functional control if a central control system exists on base. Otherwise, provide evapotranspiration-measuring control with flow meter and master valve with controller capable of indicating visible or auditory notification, such as a blinking light or beeping sound, of system shut-off.

G205007 1.3 ZONING

Provide separate control valves for differing plant species coefficients, landscape coefficients, and solar exposures, for areas with differing irrigation head types or differing precipitation rates, and top and bottom of slopes. Provide a separate irrigation backflow prevention device and water meter. Turf, trees, and shrubs/groundcover are not allowed on the same valve. Provide separate concrete valve box with cast iron lid and valve ID for each valve and wire splice. Provide quick coupling valves at 100 feet (30 m) on center. Provide in-head check valves for sloped areas with 0.5 feet (150 mm) or more in elevation change.

G205007 1.4 TEMPORARY IRRIGATION

Provide ultra-violet resistant pipe and fittings for above-grade, temporary irrigation. Only non-pressure pipe is allowed above grade. Install irrigation systems intended to remain in place longer than one year below grade.

G205007 1.5 NON-POTABLE IRRIGATION

Provide lavender-colored pipe, sprinkler head and quick coupler caps, valve tags, signage, and associated filtration equipment.

G205007 1.5.1 Controller Charts

Provide one chart for each new controller or existing re-sequenced controller. The chart must be an actual plan reduced to fit inside maximum dimensions of the controller housing. Use black line print for chart and a different color to indicate each station area of coverage. After chart is completed and approved for final acceptance, seal chart between two 20 mil (0.5 mm) pieces of clear plastic. Affix the chart to the inside of the controller cabinet door using approved mastic or fastening system. Provide one additional copy of the chart in electronic format. Additionally, provide the installation with a maintenance plan and schedule as part of the turn-over items.

-- End of Section --

SECTION G30

SITE CIVIL/MECHANICAL UTILITIES
09/22

G30 GENERAL

RFP Part 3 including the Engineering System Requirements (ESR) provide project specific requirements. The RFP Part 4, Performance Technical Sections (PTS) provide generalized technical requirements that apply to multiple facility types and include more requirements than are applicable to any one project. Therefore, only the RFP Part 4 requirements that apply to the project and further define the RFP Part 3 project specific requirements are required.

G30 1.1 DESIGN GUIDANCE

Provide the design and installation in accordance with the following references. This Performance Technical Specification (PTS) adds clarification to the fundamental requirements contained in the following Government Standards. The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification*.

Industry standards, codes, and Government standards referenced in the section text that are not found in the Unified Master Reference List (UMRL) in the Federal Facility Criteria (FFC) at the Whole Building Design Guide (WBDG) website, are listed below for basic designation identification. Comply with the required and advisory portions of the current edition of the referenced standard at the time of Contract award.

G30 1.1.1 Industry Standards and Codes

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

G30 1.1.2 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s): UFC 1-200-02, High Performance and Sustainable Building RequirementsUFC 3-201-01, Civil EngineeringUFC 3-230-01, Water Storage, Distribution, and TransmissionUFC 3-240-01, Wastewater CollectionUFC 3-240-01, Mechanical Engineering UFC 3-600-01, Fire Protection Engineering for

Facilities)

UFC 3-460-01 Design: Petroleum Fuel Facilities

G30 1.2 QUALITY ASSURANCE

Materials and assemblies installed in the work must be inspected and found to be in compliance with industry standards and these specifications prior to acceptance of the work. Remove items found not to be in compliance, or take corrective measures, to assure compliance with the referenced standard. Perform field tests and provide labor, equipment and incidentals required for testing.

G30 1.2.1 Materials

Provide new materials that bear the label of the standardizing agency whenever standards have been established and label service is normally and regularly furnished by the agency. Equipment provided must be listed and suitably labeled for the specified purpose, environment, and application and installed in accordance with manufacturer's recommendations.

G30 1.2.2 Additional Work

Provide such other labor and materials as are required for a complete and usable system in accordance with the requirements of the criteria listed, regardless of whether such materials and associated labor are called for elsewhere in this RFP.

G30 1.2.3 Qualifications of Well Drillers for Water Supply Wells

If required by the state waterworks' regulations, the well driller must be certified by the state and remain certified while constructing the well.

G30 1.2.4 Qualifications of Coating Contractors for Water Storage Tanks

Contractors and subcontractors that perform surface preparation or coating application must be certified by the Society for Protective Coatings (formerly Steel Structures Painting Council) (SSPC) to the requirements of SSPC QP 5 for the inspection firm prior to Contract award, and remain certified while accomplishing any surface preparation or coating application. The Coating Inspector must also be certified to Level II for exterior and Level III for interior coatings prior to and during the project.

G30 1.2.5 Qualifications of Oil Interceptor Manufacturers

Manufacturers must have five years of experience producing packaged oil interceptor units of similar size.

G30 1.3 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Compliance with the requirements will be determined by a review of the design

and construction submittals and by field inspection. See Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, and Part 2 Section 01 33 00.05 20, *Construction Submittal Procedures*, for additional requirements.

Verify satisfactory utility system performance via Performance Verification Testing, as detailed in this section of the RFP. Verify satisfactory performance also via testing as detailed in the paragraph, "Field Quality Control", in UFGS Specification Sections utilized.

G30 1.3.1 Water Supply Well Performance Verification

Upon completion of the permanent well, conduct performance testing for well capacity, drawdown and pump equipment. Conduct water quality testing in accordance with AWWA A100 and its appendices and state regulations.

G30 1.3.2 Water Distribution System Verification Testing

Provide testing on water mains and service lines in accordance with the state waterworks' regulations and the following:

a. Ductile Iron and other materials: AWWA C600.
b. PVC: AWWA C605.

Where water mains and water service lines provide fire service, test in accordance with NFPA 24.

Do not begin testing on any section of a pipeline where concrete thrust blocks have been provided until at least 5 days after placing of the concrete.

G30 1.3.3 Fire Distribution System Verification Testing

Test water mains and water service lines providing fire service or water and fire service in accordance with NFPA 24. The additional water added to the system must not exceed the limits given in NFPA 24.

G30 1.3.4 Water Booster Pump Station Verification Testing

Test the water booster pump station in accordance with state regulations. Conduct testing on discharge and site piping in accordance with tests for water distribution mains; see G30, paragraph 1.3.2. Test pumps, controls, and alarms, in operation, under design conditions to ensure proper operation of equipment.

G30 1.3.5 Sanitary Sewer Distribution System Verification Testing

Provide testing on sewer mains and laterals in accordance with state regulations.

G30 1.3.5.1 Deflection Test

Deflection of pipe in the installed pipeline under external loads must not exceed 4.5 percent of the average inside diameter of pipe, in accordance with ASTM D 2412.

G30 1.3.5.2 VISUAL TEST

Perform a visual inspection of the existing sewer before making a connection to the existing sewer line. Verify existing sewer line does not connect to or drain to the storm drainage system. Visually inspect downstream manholes connecting the existing sewer as well as the upstream and downstream manholes where the point of connection will be made to verify that there is no potential for cross connection to the storm sewer system. Perform visual inspection in the presence of the Contracting Officer and Public Works PW6 field support. Obtain approval from the Contracting Officer before making the connection.

Perform a dye check from the project to the first manhole on the next active sewer branch main downstream from the sewer branch main used as the project point of connection. Continue testing until the dye visually confirms the design connection is appropriate. Utilize a nontoxic non-staining sewer tracing dye. During the test monitor the storm drainage system downstream from the project, via either manholes or outfalls for any sign of cross connection.

Perform a smoke test on the project sewer. Testing will verify that project storm drainage inlets or drains have not been connected to the sanitary sewer.

These tests must be observed by the Contracting Officer and the utility operator's inspector.

G30 1.3.5.3 Leakage Tests

Test lines for leakage by either infiltration tests or exfiltration tests, or by low-pressure air tests. Prior to testing for leakage, backfill trench up to at least lower half of pipe. To prevent pipeline movement during testing, place additional backfill around pipe sufficient to prevent movement, but leaving joints uncovered to permit inspection. The leakage allowance is indicated in AWWA C 600 for ductile iron pipelines; AWWA C 605 for polyvinyl chloride pipelines; and the state sewerage regulations, whichever is more stringent. When leakage or pressure drop exceeds the allowable amount make satisfactory correction and retest pipeline section in the same manner. Correct visible leaks regardless of leakage test results.

a. Exfiltration Tests:

ASTM C 969M (ASTM C 969) and perform calculations in accordance with its Appendix.

b. Low-pressure Air Tests:

i. Pipelines: ASTM C 924M (ASTM C 924) and perform calculations in accordance with its Appendix.

ii. PVC plastic pipelines: UBPPA UNI-PUB-6 and perform calculations in accordance with its Appendix.

G30 1.3.5.4 TV Inspection for Sanitary Sewer

Complete the post-installation TV inspection to confirm that the completed lines are free of defects. For video recordings include an audio track recorded by the inspection technician during the actual inspection work describing the parameters of the line being inspected. The minimum information to be included is the pipe material, pipe size, starting and stopping manholes and descriptions of any features as they occur. Video recording playback must be at the same speed that it was recorded. Permanently label CDs / DVDs according to their contents; CDs / DVDs will become the property of the Government.

Provide TV inspections of sanitary sewer mains in accordance with the Pipeline Assessment and Certification Program as sponsored by the National Association of Sewer Service Companies (NASSCO). Prior to initiating CCTV inspection, provide copies of PACP Certification of the operators performing the work.

Complete pipe segments and manhole work, including pipe penetrations, manhole benches, main line and manhole visual inspection, pressure testing, deflection and leakage tests on a section of line (manhole to manhole) prior to performing TV.

Complete post-installation TV inspection in the presence of the Contracting Officer or designated representative.

The importance of accurate measurements is emphasized. The meter device must be accurate to one tenth of a foot.

Utilize the full capabilities of the camera equipment to document the completion and the conformance of the work to the Contract Documents. Provide a full 360 degree view of the pipe, joints and service connections. Move the camera through the line in either direction at a moderate rate, stopping to permit proper documentation of the sewer's condition. The maximum speed must be no greater than 30 feet per minute. Use manual winches, power winches, TV cable and powered rewinds or other devices that do not obstruct the camera view or interfere with the proper documentation of the sewer conditions to move the camera through the sewer line.

Once video recording has commenced, the recording must be continuous, without interruption, until the termination manhole is reached.

Provide a color video showing the completed work. Prepare and submit Television Inspection Logs providing location of service connections along with the location of any discrepancies.

Keep computer printed location records (Television Inspection

Logs) and clearly show the location and orientation in relation to an adjacent manhole for each point observed during the TV inspection. Record features of significance such as locations and orientations of service connections, pipe deflections, leaks, rolled or dislodged gaskets, sags or bellies in the line, or wide joints.

Document noted defects and lateral connections as color digital files and color hard copy prints. Photo logs must accompany each photo submitted.

Prior to submission of the TV inspection video, Television Inspection Logs, and digital photographs to the Contracting Officer, review the submittal items to ensure compliance with the quality criteria set forth in this specification. Provide a copy of such video along with the Television Inspection Logs and Digital photographs to the Contracting Officer within five business days of completion of the video-inspection. In the event that the video, Television Inspection Logs or digital photographs are deemed of poor quality or substandard by the Contracting Officer, the videos, Television Logs, or digital photographs will be returned and a re-inspection provided by the Contractor, at no additional cost to the Government.

G30 1.3.6 Sanitary Sewer Manholes Verification Testing

Provide a visual inspection of manholes for proper grade and water tightness. Provide testing on sanitary sewer manholes in accordance with state regulations. At minimum, perform hydraulic testing in accordance with ASTM C 969/C 969M.

G30 1.3.7 Wastewater Pump Station Verification Testing

Test the wastewater pump station in accordance with state regulations. Conduct testing on discharge piping and force main in accordance with tests for water distribution mains; see G30, paragraph 1.3.2. Test pumps, controls, and alarms, in operation, under design conditions to ensure proper operation of equipment.

G30 1.3.8 Storm Sewer System Verification Testing

G30 1.3.8.1 Deflection Test

Deflection of pipe in the installed pipeline under external loads must not exceed 4.5 percent of the average inside diameter of pipe, in accordance with ASTM D 2412.

G30 1.3.8.2 TV Inspection for Storm Sewer Under Pavements

Complete the post-installation TV inspection to confirm that the completed lines are free of defects. For video recordings include an audio track recorded by the inspection technician during the actual inspection work describing the parameters of the line being inspected. The minimum information to be included is the pipe material, pipe size, starting and stopping manholes and descriptions of any features as they occur. Video

recording playback must be at the same speed that it was recorded. Permanently label CDs / DVDs according to their contents; CDs / DVDs become the property of the Government.

Provide TV inspections of storm sewer lines in accordance with the Pipeline Assessment and Certification Program as sponsored by the National Association of Sewer Service Companies (NASSCO). Prior to initiating CCTV inspection, provide copies of PACP Certification of the operators that perform the work.

Complete pipe segments and manhole work, including pipe penetrations, manhole benches, main line and manhole visual inspection, pressure testing, and deflection test on a section of line (manhole to manhole) prior to performing TV.

Complete post-installation TV inspection in the presence of the Contracting Officer or designated representative.

The importance of accurate measurements is emphasized. The meter device must be accurate to one tenth of a foot.

Utilize the full capabilities of the camera equipment to document the completion and the conformance of the work to the Contract Documents. Provide a full 360 degree view of the pipe, joints and service connections. Move the camera through the line in either direction at a moderate rate, stopping to permit proper documentation of the sewer's condition. The maximum speed must be no greater than 30 feet per minute. Use manual wenches, power winches, TV cable and powered rewinds or other devices that do not obstruct the camera view or interfere with the proper documentation of the sewer conditions to move the camera through the sewer line.

Once video recording has commenced, the recording must be continuous, without interruption, until the termination manhole is reached.

Provide a color video showing the completed work. Prepare and submit Television Inspection Logs providing location of service connections along with the location of any discrepancies.

Keep computer printed location records (Television Inspection Logs) and clearly show the location and orientation in relation to an adjacent manhole for each point observed during the TV inspection. Record features of significance such as locations and orientations of service connections, pipe deflections, leaks, rolled or dislodged gaskets, sags or bellies in the line, or wide joints.

Document noted defects and lateral connections as color digital files and color hard copy prints. Photo logs must accompany each photo submitted.

Prior to submission of the TV inspection video, Television Inspection Logs, and digital photographs to the Contracting

Officer, review the submittal items to ensure compliance with the quality criteria set forth in this specification. Provide a copy of such video along with the Television Inspection Logs and Digital photographs to the Contracting Officer within five business days of completion of the video -inspection. In the event that the video, Television Inspection Logs or digital photographs are deemed of poor quality or substandard by the Contracting Officer, the videos, Television Logs, or digital photographs will be returned and a re-inspection provided by the Contractor, at no additional cost to the Government.

G30 1.4 DESIGN SUBMITTALS

Submit design submittals in accordance with Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, FC 1-300-09N, *Navy and Marine Corps Design Procedures*, UFC 3-201-01, *Civil Engineering*, and UFC 3-401-01, *Mechanical Engineering*.

Provide sustainability submittals in accordance with Part 2 UFGS Section 01 33 29, *Sustainability Requirements and Reporting*.

G30 1.5 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*. In addition to the Z10 requirements, the Designer of Record (DOR) must approve the following construction submittals as a minimum:

Test reports.

Provide sustainability submittals in accordance with Part 2 UFGS Section 01 33 29, *Sustainability Requirements and Reporting*.

G30 1.6 COORDINATION

To the extent that site work is indicated on the RFP drawings, verify that the locations and inverts of site utility lines are coordinated with building utility lines. Make adjustments to the locations and inverts indicated on the RFP drawings in accordance with codes and standards.

G30 1.7 ANTITERRORISM (AT) STANDARDS

Incorporate the minimum AT standards indicated in UFC 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings*.

G30 1.8 BACKFLOW PREVENTION

Submit backflow prevention training certificates and backflow preventer devices certification in accordance with Part 2 UFGS Section 01 50 00, *Temporary Construction Facilities and Controls*.

G30 1.9 WATER STORAGE TANK

Submit a certificate signed by a registered professional engineer providing a (1) description of the entire tank and foundation structural design loading

conditions; (2) description of structural design methods and codes used in establishing allowable stresses and safety factors; (3) statement that the structural design has been checked by experienced engineers specializing in hydraulic structures to ensure that design calculations for member sizes, dimensions and fabrication processes are as prescribed by ACI and AWWA standards; and (4) certification that the completed work was inspected in accordance with AWWA D100 or AWWA D103.

G30 1.10 NACE CERTIFIED CATHODIC PROTECTION SPECIALIST QUALIFICATIONS

Submit qualifications of specialist prior to site welding. Submit documentation of current NACE certification.

G30 1.11 EXCAVATION, BACKFILLING AND COMPACTION OF UTILITIES

Refer to Section G10, *Site Preparation*.

G30 1.12 DELIVERY, STORAGE AND HANDLING OF MATERIALS

Inspect materials delivered to site for damage. Unload and store with minimum handling. Store materials on site in enclosures or under protective covering. Store plastic piping, jointing materials and rubber gaskets under cover out of direct sunlight. Do not store materials directly on the ground. Keep inside of pipes, fittings, valves, and hydrants free of dirt and debris. Handle in a manner to ensure delivery to the trench in sound undamaged condition. Take special care to avoid injury to coatings and linings on pipe and fittings; make satisfactory repairs if coatings or linings are damaged. Carry, do not drag pipe to the trench.

G3010 WATER SUPPLY

G3010 1.1 WATER SYSTEM DESIGN

Determine domestic and fire demands for the facility and verify the design of all components of the domestic and fire protection supply systems. Design and construct the water system in accordance with UFC 3-230-01, *Water Storage, Distribution, and Transmission;* the state waterworks' regulations, and the utility provider's requirements. Design the water supply systems to provide required flows and maintain residual pressures based upon peak demands.

If the new water system is an extension of an existing water system, obtain static pressure, residual pressure and flow characteristics of the existing distribution system by actual field tests. Conduct flow and pressure tests and provide design calculations that show the existing lines are capable of handling the additional flows. Connect the new water system to the nearest existing fitting or water line capable of handling the additional flows.

Design the connections to the water system including the meter assemblies and backflow-preventing devices in accordance with the requirements of the Activity or utility provider and the state waterworks regulations.

Wherever possible, locate valve boxes and other utility access structures out of paved areas.

G301001 WELL SYSTEMS

Design and construct the potable water well system in accordance with AWWA A100 and its appendices; the state waterworks' regulations, and the system owner's preferences and requirements.

G301001 1.1 WATER METER

Provide a water meter on the well pump discharge piping aboveground in a pump enclosure or in a meter vault underground. Provide type of water meter and remote reading capability in accordance with system owner's preferences and requirements: AWWA C700, displacement type; AWWA C701, turbine type; or AWWA C702, compound type.

G301001 1.2 TEST HOLE

Drill test hole(s) at the well site before construction of the permanent well to determine the existing site-specific geologic and hydrologic conditions and groundwater-quality parameters. A test hole may be incorporated into the finished construction provided it meets the requirements for a finished well. Seal test holes not used in finished construction as recommended in accordance with AWWA C654 and the state waterworks' regulations. Upon completion of test hole, provide recommendations for permanent wells and submit data obtained at each well site. Include with the recommendations the appropriate depth, details of construction, length and location of screens, screen openings, gravel size, grout, and an estimation of the quantity of water that can be obtained from each water-bearing stratum and from each completed well. Submit electric log, a drillers log drawn to scale with coarseness and fineness modulus of each strata, time penetration log (time to drill through each formation), and sieve analysis to substantiate recommendations.

G301001 1.3 WELL CONSTRUCTION

G301001 1.3.1 Well Development

Provide well development in accordance with AWWA A100 and the state waterworks' regulations.

G301001 1.3.2 Disinfection

Disinfect well, equipment, and material in accordance with AWWA C654 and the state waterworks' regulations. Provide a sanitary seal for the well to prevent contamination until the pump foundation and pump are installed on the well.

G301001 1.4 ABANDONMENT OF EXISTING WELLS

Abandon and seal existing wells in accordance with AWWA A100 and the state waterworks' regulations.

G301002 POTABLE WATER DISTRIBUTION

G301002 1.1 WATER SYSTEM DESIGN

Provide materials, equipment, labor, testing, and miscellaneous related

items for water distribution mains and service lines to the facility and connections to the existing water system in accordance with UFC 3-230-01, *Water Storage, Distribution, and Transmission*; the utility provider's requirements; and the state waterworks' regulations; whichever is more stringent.

Determine available flow at the residual pressure at each point of connection by conducting flow tests in accordance with AWWA M17 and NFPA 291.

Provide water main piping, service lines, fittings, valves, accessories and other materials in compliance with the American Water Works Association (AWWA) standards for a minimum system working pressure of 150 psi (1050 kPa).

G301002 1.2 WATER DISTRIBUTION MAINS

For underground applications, utilize ductile iron or PVC piping for water mains 12 inches (300 mm) in diameter and less. Utilize ductile iron piping for water mains deeper than 10 feet (3.0 m) or larger than 12 inches (300 mm) in diameter.

For aboveground applications, utilize flanged ductile iron pipe for water mains.

G301002 1.2.1 Materials

a. Ductile Iron Pressure Pipe

1) Pipe: AWWA C151, Pressure Class 350.

2) Fittings: AWWA C110 or AWWA C153.

3) Interior Lining: AWWA C104.

4) Exterior Protection (if required): AWWA C105, polyethylene encasement.

b. PVC Pressure Pipe

1) Pipe: AWWA C900, Pressure Class 150.

2) Fittings: Ductile Iron (AWWA C110 or AWWA C153).

c. Flanged Ductile Iron Pipe

1) Pipe: AWWA C115 and its appendices.

2) Fittings: AWWA C110 or AWWA C153.

3) Lining: AWWA C104.

G301002 1.2.2 Installation

a. Ductile Iron: AWWA C600.
b. PVC: AWWA C605.

Provide nondetectable warning tape and a continuous length of tracer wire for the full length of each run of nonmetallic piping below grade. Warning tape to be color coded with warning and identification of

utility type imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (utility type) LINE BELOW" or similar wording. Color to be blue for potable water systems and purple for nonpotable, reclaimed water, and irrigation lines. Terminate tracer wire above grade at valve boxes and at exterior of building.

G301002 1.2.3 Connections to Existing Water Lines

Make connections to existing water lines after approval from the system owner is obtained and with a minimum interruption of service on the existing line. Make connections to existing lines under pressure in accordance with the recommended procedures of the manufacturer of the pipe being tapped.

G301002 1.3 WATER SERVICE LINES

Utilize copper tubing or PVC piping for water service lines less than 4 inches (100 mm) in diameter.& Utilize ductile iron pipe or PVC pressure pipe for water service lines 4 inches (100 mm) and 6 inches (150 mm) in diameter; see G301002, paragraph 1.2, "Water Distribution Mains" for additional requirements for ductile iron and PVC piping.

G301002 1.3.1 Materials

a. Copper Tubing

1) Pipe: ASTM B 88/B 88M, Type K.

2) Fittings for Solder-Type Joint: ANSI B16.8 or ASME B16.22.

3) Fittings for Compression-Type Joint: ASME B16.26, flared tube type.

b. PVC Pressure Pipe

1) Pipe: ASTM D1785, Schedule 40 or ASTM D 2241, with SDR rating for 160 psi (1.1 MPa) pressure rating.

2) Fittings: ASTM D 2466.

3) Joints: Elastomeric gaskets for pressure rating; solvent cement joints, ASTM D 2564.

G301002 1.3.2 Service Connections

Connect service lines 2-inch (50 mm) diameter or less to the main by a corporation stop and install a gate valve on service line below the frostline.

a. Ductile-iron water mains: AWWA C600.
b. PVC water mains: UBPPA UNI-PUB-8 and the recommendations of AWWA M23, Chapter 9, "Service Connections."

G301002 1.3.3 Installation

Install pipe, fittings and accessories in accordance with

manufacturer's instructions.

a. Metallic Piping: in accordance with requirements of AWWA C600.
b. PVC: ASTM D 2774 and ASTM D 2855.

G301002 1.4 CORROSION PROTECTION

G301002 1.4.1 Insulating Joints

Provide insulating joints to prevent contact between dissimilar metals at the joint between adjacent sections of piping in accordance with the pipe manufacturer's recommendations. Ensure that there is no metal-to-metal contact between dissimilar metals after the joint has been assembled.

To prevent the possibility of bi-metallic corrosion, wrap service lines of dissimilar metal to the water mains and the attendant corporation stops with polyethylene or dielectric tape for a minimum clear distance of 3 feet (900 mm) from the main.

G301002 1.5 VALVES

Install valves with the same diameter and have the same joint ends as the mains to which they are installed. Provide each type of valve from one manufacturer.

G301002 1.5.1 Gate Valves

G301002 1.5.1.1 Location

Install valves at new points of connection. At a minimum, locate valves to ensure that no more than two fire hydrants will be out of service in the event of a single break in a water main. Locate valves outside of pavement and heavy traffic areas whenever possible.

G301002 1.5.1.2 Gate Valves 3-inch (75 mm) and Larger in Diameter

a. Valves (20-inch and smaller in diameter): AWWA C509 or AWWA C515, nonrising stem and of one manufacturer.
b. Valves (greater than 20-inch in diameter): AWWA C500.
c. Valves for Indicator Post: AWWA C509 or AWWA C500, as indicated above, with indicator post flange in accordance with requirements of UL 262.
d. Interior Coating: AWWA C550.

G301002 1.5.1.3 Gate Valves Smaller than 3-inch (75 mm) in Diameter

MSS SP-80, Class 150, solid wedge. Provide valves with flanged or threaded end connections, with unions on both sides of the valve and a handwheel operator.

G301002 1.5.1.4 Valve Box

Provide a cast iron, adjustable, valve box for each gate valve

on buried piping. Provide valve boxes of a size suitable for the valve on which it is to be used with a minimum diameter of 5-1/4 inches (130 mm). Provide a round head and cast the word "WATER" on the lid.

G301002 1.5.2 Check Valves

Provide check valves sized 2-inches (50 mm) to 24-inches (600 mm) as swing-check type (AWWA C508) and with a protective epoxy interior coating conforming to AWWA C550. For underground applications, provide check valve in a valve vault.

G301002 1.5.3 Air Release, Air/Vacuum, and Combination Air Valves

AWWA C512 and AWWA M51.

G301002 1.5.4 Corporation Stops

If service lines 2—inch diameter or less are tapping water mains, provide corporation stops. Provide ground key type, bronze corporation stops, ASTM B61 or ASTM B62.

G301002 1.5.5 Installation of Valves

Make and assemble joints to valves as specified for making and assembling the same type of joints between pipe and fittings.

G301002 1.6 WATER METERS

Provide water meter and remote reading as required by the utility provider and in accordance with AWWA standards.

G301002 1.7 BACKFLOW PREVENTION

Provide backflow prevention and cross connection control in accordance with AWWA M-14 and governing local/state plumbing codes and waterworks' regulations.

G301002 1.8 FIRE HYDRANTS

Provide fire hydrants from one manufacturer and in accordance with UFC 3-600-01, *Fire Protection Engineering*. Coordinate with the project's fire protection designer of record. Provide protection for fire hydrants located in areas subject to vehicle damage. Provide fire hydrants with National Standard threads on hose and pumper connections. Provide a 6 inch (150 mm) inlet, two 2.5 inch (62 mm) hose connections and one pumper connection sized to accommodate local fire department equipment requirements. Paint hydrants with at least one coat of primer and two coats of enamel paint. Barrel and bonnet colors must be in accordance with UFC 3-600-01. Stencil hydrant number and main size on the hydrant barrel using black stencil paint.

a. Dry Barrel Fire Hydrants: AWWA C502 with frangible sections.
b. Wet Barrel Fire Hydrants: AWWA C503 or UL 246, "Wet Barrel" design, with breakable features.

c. Installation: Install hydrants with the pumper connection facing the adjacent paved surface. If there are two, paved adjacent surfaces, contact the Contracting Officer for further direction.

G301002 1.9 THRUST RESTRAINT

Provide thrust restraint for all piping, valves, fittings, and other appurtenances of the water distribution system.

Provide thrust restraint using restrained joints in accordance with pipe manufacturer's recommendations, AWWA C600 and if for fire service main, NFPA 24.

G301002 1.10 DISINFECTION

Disinfect new water piping and existing water piping affected by Contractor's operations in accordance with the state waterworks' regulations and AWWA C651.

G301003 POTABLE WATER STORAGE

G301003 1.1 POTABLE WATER STORAGE TANKS

Provide potable water storage facilities in accordance with UFC 3-230-01, *Water Storage, Distribution, and Transmission;* and the state waterworks' regulations.

An elevated, steel water storage tank must be in accordance with AWWA D100. A ground, steel water storage tank must be in accordance with AWWA D100 for welded tanks and AWWA D103 for bolted tanks.

G301003 1.2 TANK ACCESSORIES

Provide piping and valves in accordance with G301002. Install an altitude valve in a valve vault with appropriate shut off valves and check valve.

G301003 1.3 TANK COATINGS

Utilize primer, intermediate coat and topcoat materials from one manufacturer. Secondary materials, produced or specifically recommended by the coating system manufacturer, may be used. Contrasting colors between coats are required.

G301003 1.3.1 Interior Coating System

Provide a commercially available interior coating system that is certified in accordance with AWWA D102, ICS-No. 2 or ICS-No. 5, and with NSF 61 and is in accordance with the state waterworks' regulations.

The color of the final coat must be approved in writing by the Contracting Officer before application begins.

Apply coatings at the following specified thickness:

Coat	Minimum DFT (mils)	Maximum DFT (mils)
Primer	3	5
Intermediate	3	5
Top	3	5
Total Systems	9	15

G301003 1.3.2 Exterior Coating System

Provide a commercially available, zinc/epoxy/polyurethane exterior coating system that is certified in accordance with AWWA D102, OCS-No. 6 and is in accordance with the state waterworks' regulations.

The color of the final coat must be approved in writing by the Contracting Officer before application begins.

Apply coatings at the following specified thickness:

Coat	Minimum DFT (mils)	Maximum DFT (mils)
Primer	3	5
Intermediate	3	5
Top	2	3
Total Systems	8	13

G301004 FIRE PROTECTION WATER DISTRIBUTION

G301004 1.1 GENERAL REQUIREMENTS

Refer to portions of Section G301002 and Section D40, *Fire Protection*. Provide water main piping, service lines, fittings, valves, accessories and other materials in compliance with the American Water Works Association (AWWA) standards for a minimum system working pressure of 200 psi (1380 kPa).

G301004 1.2 DETECTOR CHECKS

UL 312; detector check includes bypass meter, piping, gate valves, check valve and connections to detector check valve. Set valve to allow minimal water flow through bypass meter when major water flow is required.

G301004 1.3 FIRE DEPARTMENT CONNECTIONS

UL 405.

G301004 1.4 INDICATOR POSTS

UL 789.

G301005 FIRE PROTECTION WATER STORAGE

Design and construct Fire Protection Water Storage systems in accordance with UFC 3-600-01 and NFPA 22.

G301006 NON-POTABLE WATER DISTRIBUTION

Refer to G301002; note that system disinfection is not required.

G301007 PUMPING STATIONS

If a pump station is allowed, provide a packaged booster pump station including pumps, piping, valves, sensors, controls, and accessories to maintain the water system pressure in accordance with UFC 3-230-01, *Water Storage, Distribution, and Transmission;* and the state waterworks' regulations.

The packaged booster pump station must have an Underwriter's Laboratories (UL) label indicating compliance of the equipment under the packaged pumping systems UL listing category. This label must be inclusive of the entire station with enclosure so as to demonstrate compliance with the National Electrical Code requirements for working clearances and wiring procedures.

Interior coatings of pumps, piping, valves and other accessories must be a National Standard Foundation (NSF) Standard 61 certified material for potable water.

G301008 PACKAGED WATER TREATMENT PLANTS

Provide packaged water treatment plants in accordance with UFC 3-230-03, *Water Treatment;* for pipeline materials and the state waterworks' regulations for treatment plant requirements.

G3020 SANITARY SEWER

G3020 1.1 GENERAL REQUIREMENTS

Design and construct the gravity sanitary sewage collection system in accordance with UFC 3-240-01, *Wastewater Collection;*and the state sewer collection and treatment regulations. Connect the new sanitary sewage collection system to the nearest existing sanitary manholes or sanitary line adjacent to the project site. Provide design calculations that show the existing system is capable of handling the additional flows.

In areas where chemicals and other substances may be stored (including mechanical and electrical rooms), eliminate floor drains or make provisions to prevent spills from entering the sanitary sewer system. If there is process flow from equipment, discharge can be hard piped, with air gap, to the sanitary sewer.

Wherever possible, locate manholes and other utility access structures out of paved areas.

G302001 SANITARY SEWER PIPING

G302001 1.1 GENERAL REQUIREMENTS

Provide materials, equipment, labor, testing, and miscellaneous related items to provide sanitary sewage lines for collection and services from the buildings.

G302001 1.2 GRAVITY SEWER PIPING

For gravity sanitary sewer mains and laterals, utilize Ductile Iron, PVC or Polypropylene sewer pipe and fittings. Use Ductile Iron under roadways or at depths greater than 10 feet (3.0 m). PVC and Polypropylene may only be used under roadways or at depths greater than 10 feet (3.0 m) when written approval is received by the Government's Civil Reviewer or indicated in another part of the RFP.

G302001 1.2.1 Materials

a. PVC Gravity Sewer Pipe

1) Piping and Fittings: ASTM D3034 or ASTM F679, SDR 35.

2) Joints: ASTM D3212 and ASTM F477.

b. Ductile Iron Gravity Sewer Pipe

1) Piping: ASTM A746. Provide required Thickness Class based on design information and methods in ASTM A746.

2) Fittings: AWWA C110 or AWWA C153.

3) Joints: AWWA C111.

4) Interior Coating: AWWA C104.

5) Exterior Protection (if required): AWWA C105, polyethylene encasement.

c. Dual Wall and Triple Wall Polypropylene Sewer Pipe 12 inches to 60 inches

1) Piping and Fittings: ASTM F2736 and ASTMF2764/F2764M.

2) Joints: ASTM D3212 and ASTM F477.

G302001 1.2.2 Connections to Existing Lines

Obtain approval from the Contracting Officer before making a connection to an existing line. Conduct work so that there is minimum interruption of service on existing line and provide a new manhole at the connection point.

G302001 1.2.3 Installation

Install pipe, fittings and accessories in accordance with manufacturer's instructions.

a. PVC and Dual and Triple Wall Polypropylene: ASTM D2321. Do not use ASTM D2321 Class IV or V materials for bedding, haunching or initial backfill materials.
b. Ductile Iron: AWWA C600.

Provide nondetectable warning tape and a continuous length of tracer wire for the full length of each run of nonmetallic piping below grade. Warning tape to be color coded with warning and identification of utility type imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (utility type) LINE BELOW" or similar wording. Color to be green for sewer systems. Terminate tracer wire above grade at valve boxes and at exterior of building.

G302001 1.3 PIPING FOR CLEANOUTS

G302001 1.3.1 Materials

a. Cast-Iron Soil Pipe for Cleanouts

1) Pipe: ASTM A 74, service.

2) Joints: ASTM C 564 compression-type rubber gaskets.

3) Exterior Protection (if required): AWWA C105, polyethylene encasement.

G302001 1.3.2 Installation

Install cast iron pipe and fittings in accordance with the recommendations of the pipe manufacturer.

G302002 SANITARY SEWER MANHOLES & CLEANOUTS

G302002 1.1 GENERAL REQUIREMENTS

Provide materials, equipment, labor, testing, and miscellaneous related items for the sanitary manholes in accordance with the following:

a. Set manhole rim elevations flush with finished surface of paved areas or 1 inch (25 mm) above finished grade in unpaved areas.
b. ASTM C 923/C923M resilient connectors for making joints between manhole and pipes entering manhole.
c. Provide drop manholes when a gravity sewer pipe enters a manhole at an elevation of 24 inches (610 mm) or more above the manhole invert.

G302002 1.2 PRECAST CONCRETE MANHOLES

ASTM C 478/C 478M; base and first riser must be monolithic.

Precast manhole sections must have:

a. ASTM C 990/C 990M butyl gaskets;
b. ASTM C 443/C 443M rubber O-ring joints; or
c. ASTM C 443, Type B gaskets.

G302002 1.3 CAST-IN-PLACE CONCRETE MANHOLES

Reinforced concrete; designed according to ASTM C 890 for A-16 (AASHTO HS20-44), heavy-traffic, structural loading. Provide concrete work in accordance with ACI 301/301M and ACI 350-01; provide a minimum compressive strength of 4000 psi (28 MPa).

G302002 1.4 MANHOLE FRAMES AND COVERS

Frame and cover must be cast gray iron, ASTM A48/A48M, Class 35B, cast ductile iron, ASTM A536, Grade 65-45-12, or reinforced concrete, ASTM C478 ASTM C478M. Provide frame and cover adequate to accommodate the imposed live load. Stamp or cast the words "Sanitary Sewer" into covers so that it is plainly visible.

G302002 1.5 MANHOLE STEPS

a. Zinc-coated steel: 29 CFR 1910.27.
b. Plastic or rubber coating pressure molded to steel: ASTM D 4101, copolymer polypropylene; or ASTM C 443/C 443M, except shore A durometer hardness must be 70 plus or minus 5.

Aluminum steps or rungs are not allowed.

Steps are not required in manholes less than 4 feet (1.2 m) deep.

G302002 1.6 MANHOLE CONSTRUCTION

Where a new manhole is constructed on an existing line, remove existing pipe to construct the manhole. Cut existing pipe so that pipe ends are approximately flush with the interior face of manhole wall, but not protruding into the manhole. For changes in direction of the sewer and entering branches into the manhole, make a circular curve in the manhole invert of as large a radius as manhole size will permit. For cast-in-place concrete, no parging will be allowed on interior manhole walls.

G302002 1.7 CONNECTIONS TO EXISTING MANHOLES

Center pipe connections to existing manholes on the manhole. Holes for the new pipe must be of sufficient diameter to allow packing cement mortar around the entire periphery of the pipe but no larger than 1.5 times the diameter of the pipe. Cut the manhole in a manner that causes the least damage to the walls.

G302002 1.8 CLEANOUTS

Construct cleanouts of cast iron soil pipe and fittings; see G302001, paragraph 1.3.

G302003 LIFT STATIONS AND PUMPING STATIONS

G302003 1.1 GENERAL REQUIREMENTS

If a pump station is allowed, provide materials, equipment, labor, testing and miscellaneous related items for a packaged lift or pump station system

for the facility in compliance with the UFC 3-240-01, *Wastewater Collection*; the state sewerage regulations; and the utility provider's requirements.

G302003 1.2 SUBMERSIBLE PUMPS

Provide pumps capable of handling raw wastewater and passing spheres of at least 3 inches (75 mm) in diameter. The pump's suction and discharge openings must be at least 4 inches (100 mm) in diameter.

Provide submersible sewage pumps, with guide rail system. Include ASTM A48/A48M, Class 25, nonclog, cast-iron impeller; and hermetically sealed motor with moisture-sensing probe, mechanical seals, and waterproof power cable. Construct the guide rail system of stainless steel. Provide a stainless steel lifting chain for raising and lowering the pump in the basin.

G302003 1.3 GRINDER PUMPS

Provide grinder-type sewage pumps, with guide rail system. Include stainless steel or bronze impeller and hermetically sealed motor with moisture-sensing probe, mechanical seals, and waterproof power cable. Construct the guide rail system of stainless steel. Provide a stainless steel lifting chain for raising and lowering the pump in the basin.

G302003 1.4 SUCTION LIFT PUMPS

Provide pumps capable of handling raw wastewater and passing spheres of at least 3 inches (75 mm) in diameter. The pump's suction and discharge openings must be at least 4 inches (100 mm) in diameter.

Provide dry-chamber-mounting, vacuum-primed, nonclog sewage pumps located in dry compartment above wet pit. Include ASTM A48/A48M, Class 25, nonclog, cast iron impeller; mechanical or stuffing box seals; pedestal mounted motor; and suction piping extending to bottom of wet pit.

Provide suction-lift pumps capable of automatic rapid self priming and re-priming at the "lead pump on" elevation. Suction piping must not exceed 25 feet (7.6 meters) in total length. Priming lift at the "lead pump on" elevation must include a safety factor of at least 4 feet (1.2 meters) from the maximum allowable priming lift for the specific equipment at design operating conditions. The combined total of dynamic suction-lift at the "pump off" elevation and the required net positive suction head at design operating conditions must not exceed 22 feet (6.7 meters).

G302003 1.5 PUMP MOTOR

Provide pump motor sized to accommodate pump operation along the entire impeller curve.

G302003 1.6 STATION PIPING WITHIN WET WELL AND VALVE VAULT

G302003 1.6.1 Piping Less than 4-Inch (100 mm) in Diameter

a. PVC Pressure Pipe

1) Pipe: ASTM D 1785, Schedule 80.

2) Fittings: Schedule 80 socket fittings, ASTM D 2467; Schedule 80 threaded fittings, ASTM D 2464.

G302003 1.6.2 Piping 4 inch (100 mm) Diameter and Larger

a. Flanged Ductile Iron Pipe

1) Pipe: AWWA C115 and its appendices.

2) Fittings: AWWA C110 or AWWA C153.

3) Lining: AWWA C104.

G302003 1.7 FORCE MAINS

G302003 1.7.1 Force Mains for Submersible and Suction Lift Pumps

Force mains must be at least 4 inches (100 mm) in diameter and be constructed of either ductile iron or PVC pressure pipe.

a. Ductile Iron Pressure Pipe

1) Pipe: AWWA C151, Pressure Class 350.

2) Fittings: AWWA C110 or AWWA C153.

3) Interior Lining: AWWA C104.

4) Exterior Protection (if required): AWWA C105, polyethylene encasement.

b. PVC Pressure Pipe

1) Pipe: AWWA C900, Pressure Class 150. AWWA C905.

2) Fittings: Ductile Iron (AWWA C110 or AWWA C153).

G302003 1.7.2 Force Mains for Grinder Pumps

Utilize PVC pressure pipe for force mains less than 4 inches (100 mm) in diameter :

a. PVC Pressure Pipe

1) Pipe: ASTM D 1785, Schedule 40 or ASTM D 2241, with SDR rating for 160 psi (1.1 MPa) pressure rating.

2) Fittings: ASTM D 2466.

3) Joints: Elastomeric gaskets for pressure rating; solvent cement joints, ASTM D 2564.

G302003 1.8 PIPING ACCESSORIES

G302003 1.8.1 Insulating Joints

Provide between pipes of dissimilar metals a rubber gasket or other approved insulating joint or dielectric coupling to effectively prevent metal-to-metal contact between adjacent sections of piping.

G302003 1.8.2 Accessories

Provide flanges, connecting pieces, transition glands, transition sleeves, and other adapters as required.

G302003 1.8.3 Flexible Flanged Coupling

Provide flexible flanged coupling for sewage as indicated. Use flexible flanged coupling designed for a working pressure of 350 psi (2400 kPa).

G302003 1.9 VALVES

Provide shutoff and check valves on the discharge line of each pump. Locate the check valve between the shutoff valve and the pump. Locate valves in accordance with state sewerage regulations. Check valves must be suitable for the material being handled and placed on the horizontal portion of the discharge piping except for ball check valves, which may be placed in the vertical run. Provide valves capable of withstanding normal pressure and water hammer. Use valves from one manufacturer.

G302003 1.9.1 Shut Off Valves

G302003 1.9.1.1 Shut Off Valves Less than 4 Inch (100 mm) in Diameter

PVC ball valves.

G302003 1.9.1.2 Shut Off Valves 4 Inch (100 mm) and Larger in Diameter

AWWA C509 or AWWA C515, nonrising stem, and flanged. Provide valves with handwheels that open by counterclockwise rotation of the valve stem. Provide epoxy coating in accordance with AWWA C550.

G302003 1.9.2 Check Valves

G302003 1.9.2.1 Check Valves Less than 4-Inch (100 mm) in Diameter

Neoprene ball check valve with integral hydraulic sealing flange, designed for a hydraulic working pressure of 175 psi (1200 kPa).

G302003 1.9.2.2 Check Valves 4-Inch (100 mm) and Larger in Diameter

AWWA C508, flanged. Provide a nonclog, swing check valve rated for not less than 175 psig (1200 kPa) working pressure capable of passing 3-inch (75 mm) diameter solids.

G302003 1.9.3 Air Relief Valves

Provide air relief valves at high points in the force main to prevent air locking in accordance with AWWA M51. Provide vacuum relief valves to relieve negative pressures on force mains.

G302003 1.10 IDENTIFICATION TAGS AND PLATES

Provide valves with tags or plates numbered and stamped for their usage. Use plates and tags of brass or nonferrous material and mounted or attached to the valve.

G302003 1.11 THRUST RESTRAINT

Provide thrust restraint for force mains, valves and other features of the wastewater distribution system.

Provide thrust restraint using restrained joints in accordance with pipe manufacturer's recommendations, AWWA C600 and if for fire service main, NFPA 24.

G302003 1.12 STATION CONTROL SYSTEM

G302003 1.12.1 Operating Controls

G302003 1.12.2 Alarm Controls

Provide alarms for pumping and lift stations; at minimum provide alarms for high level, power failure, pump failure, unauthorized entry or any cause of station malfunction. Provide alarms as required by the pump manufacturer to obtain warranty.

G302003 1.12.3 Telemetry

If required, provide a telemetry system in accordance with state sewer collection and treatment regulations and system owner's requirements to relay alarms to a facility that is manned 24 hours a day.

G302003 1.13 UNDERGROUND ENCLOSURES

G302003 1.14 STATION ACCESSORIES

G302003 1.14.1 Ventilation

Provide covered wet wells with provisions for air displacement venting to the outside. Provide galvanized ASTM A 53/A 53M pipe with insect screening.

Provide adequate ventilation for pump stations.

G302003 1.14.2 Metering

Provide devices for measuring wastewater flow at pumping stations. Provide indicating, totalizing and recording flow measurement at pumping stations with a 1200 gpm (76 l/s) or greater design peak hourly flow. For smaller stations, provide elapsed time meters in

conjunction with pumping rate tests.

G302003 1.14.3 Pipe and Valve Supports

Use schedule 40 galvanized steel piping conforming to ASTM A 53/A 53M for pipe and valve supports. Provide either ANSI B16.3 or ANSI B16.11 galvanized threaded fittings.

G302003 1.14.4 Miscellaneous Metals

Use stainless steel bolts, nuts, washers, anchors, and supports for installation of equipment.

G302004 PACKAGED SANITARY SEWER TREATMENT PLANTS

Provide packaged wastewater treatment facilities in accordance with UFC 3-240-02, *Domestic Wastewater Treatment;* for pipeline materials and the state sewer collection and treatment regulations for treatment plant requirements.

G302005 SEPTIC TANKS

Provide septic tanks in accordance with the state and treatment regulations and the International Private Sewage Disposal Code 2000.

G302006 DRAIN FIELDS

Provide drain fields in accordance with the state and treatment regulations and the International Private Sewage Disposal Code 2000.

G302090 OTHER SANITARY SEWER

G302090 1.1 OIL INTERCEPTOR

Refer to G303090.

G3030 STORM SEWER

Provide materials, equipment, labor, testing, and miscellaneous related items to provide storm drainage collection system to drain the site. Design and construct the storm sewer collection system in accordance with UFC 3-201-01, *Civil Engineering;* the utility provider's requirements; and the state stormwater management laws and regulations. Design project site to prevent stormwater runoff in excess of the capacity of the existing utility system.

G303001 STORM SEWER PIPING

G303001 1.1 PIPING

Storm sewer piping 12 inches (300 mm) and larger in diameter must be reinforced concrete, ductile iron or corrugated steel; PVC, corrugated aluminum, polyethylene and polypropylene pipe may only be used when written approval is received by the Government's Civil Reviewer or indicated in another part of the RFP.

Utilize perforated PVC or HDPE for subsurface drainage piping.

G303001 1.1.1 Materials

a. PVC Pipe

1) Piping and Fittings: ASTM D3034, SDR 35.

2) Joints: ASTM D3212 and ASTM F477.

b. Ductile Iron Pipe

1) Piping: ASTM A746. Provide required Thickness Class based on design information and methods in ASTM A746.

2) Fittings: AWWA C110 or AWWA C153.

3) Joints: AWWA C111.

4) Interior Coating: AWWA C104.

5) Exterior Protection (if required): AWWA C105, polyethylene encasement.

c. Reinforced Concrete Pipe

1) Circular Pipe: ASTM C76/C76M. Provide required Class based on design information and methods in ASTM C76/C76M. Class III minimum.

2) Elliptical Pipe: ASTM C507/C507M. Provide required Class based on design information and methods in ASTM C76/C76M.

3) Joints:

a) ASTM C990/C990M butyl gaskets;

b) ASTM C 443/C 443M rubber O-ring joints; or

c) AASHTO M 198, Type B preformed plastic gaskets.

d. Corrugated Aluminum Pipe

1) Piping: ASTM B745/B745M.

2) Joints: Coupling bands conforming to ASTM B745/B745M.

3) Coating: Fully bituminous coated in accordance with ASTM A849. For applications where piping is part of a piped storm sewer system (not a culvert), provide pipe fully bituminous coated, invert (half) paved with concrete lining in accordance with ASTM A849.

e. Corrugated Steel Pipe

1) Piping: ASTM A760/A760M.

2) Joints: Coupling bands conforming to ASTM A760/A760M.

3) Coating: Fully bituminous coated in accordance with ASTM A849. For applications where piping is part of a piped storm

sewer system (not a culvert), provide pipe fully bituminous coated, invert (half) paved with concrete lining in accordance with ASTM A849.

f. Polyethylene (PE) Pipe

1) Piping 12 inches to 60 inches and Fittings: ASTM 2648/F2648M and AASHTO M 294 Type S, corrugated.

2) Joints: ASTM F477 and ASTM D3212

g. Dual and Triple Wall Polypropylene (PP) Pipe

1) Piping 12 inches to 60 inches and Fittings: ASTM F2736, ASTM F2764/F2764M, ASTM F2881 and AASHTO M 330 Type S or D

2) Joints: ASTM F477 and ASTM D3212

h. Perforated PVC Pipe: ASTM D 2729.

i. Perforated PE Pipe

1) Piping and Fittings: AASHTO M 294, Type SP, corrugated.

2) Joints: AASHTO M 294, Soiltight.

G303001 1.1.2 Installation

Install piping in accordance with manufacturer's recommendations and the following standards:

1. PVC, PE and Dual and Triple Wall PP: ASTM D 2321. Do not use ASTM D 2321 Class IV or V materials for bedding, haunching or initial backfill materials.
2. Ductile Iron: AWWA C600.
3. Reinforced Concrete: ACPA 01-102 and 01-103.
4. Corrugated Aluminum: ASTM B 788/B 788M.
5. Corrugated Steel: ASTM A 798/A 798M.
6. Perforated PVC and Perforated PE: ASTM D 2321. Do not use ASTM D 2321 Class IV or V materials for bedding, haunching or initial backfill materials.

Provide nondetectable warning tape and a continuous length of tracer wire for the full length of each run of nonmetallic piping below grade. Warning tape to be color coded with warning and identification of utility type imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (utility type) LINE BELOW" or similar wording. Color to be green for sewer systems. Terminate tracer wire above grade at valve boxes and at exterior of building.

G303001 1.2 PIPING FOR CLEANOUTS

G303001 1.2.1 Materials

a. Cast-Iron Soil Pipe for Cleanouts

1) Pipe: ASTM A 74, service.

2) Joints: ASTM C 564 compression rubber gaskets.

3) Exterior Protection (if required): AWWA C105, polyethylene encasement.

G303001 1.2.2 Installation

Install cast iron pipe and fittings in accordance with the recommendations of the pipe manufacturer.

G303002 STORM SEWER STRUCTURES

G303002 1.1 GENERAL REQUIREMENTS

Provide materials, equipment, labor, testing, and miscellaneous related items for the drainage structures in accordance with the following:

a. Structure rim elevations must be set flush with finished surface of paved areas or 1 inch (25 mm) above finished grade in unpaved areas.
b. Resilient connectors for making joints between manhole and pipes entering manhole must conform to ASTM C 923M (ASTM C 923).
c. Provide precast or cast-in-place concrete drainage structures, headwalls and gutters.

G303002 1.2 PRECAST CONCRETE INLETS

Provide work and materials in accordance with requirements of the State Highway Specifications (SHS) and standards where the project is located.

G303002 1.3 CAST-IN-PLACE CONCRETE DRAINAGE STRUCTURES

Provide work and materials in accordance with drainage structures indicated in the State Highway Specifications (SHS) and standards where the project is located.

G303002 1.4 DRAINAGE STRUCTURE FRAMES AND COVERS

Frame and cover for gratings must be cast gray iron, ASTM A48/A48M, Class 35B; cast ductile iron, ASTM A536, Grade 65-45-12; or cast aluminum, ASTM B26/B26M, Alloy 356.OT6. Frame and cover must be designed to accommodate the imposed live loads. Stamp or cast the words "Storm Sewer" into covers so that it is plainly visible.

Covers must be of the same material as the frames (i.e. ductile iron frame with ductile iron cover, galvanized steel frame with galvanized steel cover). Perform proof loading in accordance with ASTM A 48/A 48M. The finished structure must be level and non-rocking, with the top flush with the surrounding pavement.

G303002 1.5 DRAINAGE STRUCTURE STEPS

a. Zinc-coated steel: 29 CFR 1910.27.
b. Plastic or rubber coating pressure molded to steel: ASTM D 4101, copolymer polypropylene; or ASTM C 443/C 443M, except shore A durometer hardness must be 70 plus or minus 5.

Aluminum steps or rungs are not allowed.

Steps are not required in structures less than 4 feet (1.2 m) deep.

G303002 1.6 DRAINAGE STRUCTURE CONSTRUCTION

Where a new structure is constructed on an existing line, remove existing pipe to construct the structure. Cut existing pipe so that pipe ends are approximately flush with the interior face of structure wall, but not protruding into the structure.

G303002 1.7 CONNECTIONS TO EXISTING STRUCTURES

Center pipe connections to existing structures on the structure. Holes for the new pipe must be of sufficient diameter to allow packing cement mortar around the entire periphery of the pipe but no larger than 1.5 times the diameter of the pipe. Cut the structure in a manner that causes the least damage to the walls.

G303002 1.8 CLEANOUTS

Construct cleanouts of cast iron soil pipe and fittings; see G303001, paragraph 1.2.

G303003 LIFT STATIONS

A stormwater pump station(s) will not be allowed.

G303004 CULVERTS

Provide reinforced concrete or corrugated steel piping for culverts 12 inches (300 mm) and larger in diameter; PVC, corrugated aluminum, polyethylene and polypropylene pipe may only be used when written approval is received by the Government's Civil Reviewer or indicated in another part of the RFP. See G303001, paragraphs 1.1.1 and 1.1.2 for material and installation requirements.

Provide flared end sections of the same material as the pipe material.

Provide erosion control in accordance with the State Erosion and Sedimentation Control Standards or EPA guidance where State Standards are unavailable.

G303005 HEADWALLS

Provide cast-in-place concrete headwalls in accordance with the State Highway Specification (SHS) and standards where the project is located.

G303006 EROSION & SEDIMENT CONTROL MEASURES

Refer to Section G103011.

G303007 STORMWATER MANAGEMENT

G303007 1.1 STORMWATER COLLECTION AND STORAGE

Provide permanent stormwater management (i.e., detention and retention ponds, LID and other drainage features) to control stormwater runoff in accordance with UFC 3-201-01, *Civil Engineering*, UFC 3-210-10, *Low Impact*

Development, FC 1-300-09N *Navy and Marine Corps Design Procedures*, State and local stormwater management Laws and Regulations and project sustainability goals. Integrate permanent stormwater management features into the site design in accordance with UFC 3-201-01, *Civil Engineering*.

Parking areas, roads, walks, courtyards, training areas and similar site features may not be used to detain or retain stormwater. Manage stormwater within detention or retention ponds and the LID features indicated in Part 3 of this RFP. Prevent upstream and downstream property damage.

G303090 OTHER STORM SEWER

G303090 1.1 OIL INTERCEPTOR

Provide an oil interceptor to remove free oil from oil-in-water mixtures originating from proposed facility operations. Provide grit protection upstream of the oil interceptor.

Provide an oil interceptor utilizing coalescing media and conforming to the guidelines of the American Petroleum Institute (API).

Provide materials or a coating system which protects the interceptor from the oil-in-water mixture, atmosphere, and in-situ soil conditions.

Use an interceptor with a completely removable cover.

G3040 HEATING DISTRIBUTION

G304001 OVERHEAD HOT WATER SYSTEMS

G304001 1.1 PIPING & FITTINGS

Hot water piping must be ASTM A 53, Type E (electric-resistance welded), Grade A or B), or Type S (seamless, Grade A or B); black steel, Weight Class XS (Extra Strong). ASTM A 106, Grade A or B, black steel, Schedule 80 may be used.

G304001 1.2 INSULATION

Mineral fiber, calcium silicate, or cellular glass pipe insulation with aluminum jacket which matches existing or surrounding insulation. Paint jacket to suit Base Architectural Plan. The minimum insulation thickness must be in accordance with the following table:

Table 1 Insulation Thickness for Hot Water Systems

Nominal Pipe Diameterinches (mm)	Mineral Fiberinches (mm)	Calcium Silicateinches (mm)	Cellular Glassinches (mm)
1.00 (25)	1.5 (38)	1.5 (38)	1.5 (38)
1.5 (38)	1.5 (38)	1.5 (38)	1.5 (38)
2.0 (51)	1.5 (38)	1.5 (38)	1.5 (38)

2.5 (64)	1.5 (38)	1.5 (38)	1.5 (38)
3.0 (76)	1.5 (38)	1.5 (38)	1.5 (38)
4.0 (100)	2.0 (51)	2.5 (64)	1.5 (38)
5.0 (125)	2.0 (51)	2.5 (64)	1.5 (38)
6.0 (150)	2.5 (64)	2.5 (64)	1.5 (38)
8.0 (200)	2.5 (64)	2.5 (64)	1.5 (38)
10.0 (250)	2.5 (64)	2.5 (64)	1.5 (38)
12.0 (300)	2.5 (64)	2.5 (64)	1.5 (38)
14.0 (350)	2.5 (64)	2.5 (64)	1.5 (38)
16.0 (400)	2.5 (64)	2.5 (64)	1.5 (38)
18.0 (450)	2.5 (64)	2.5 (64)	1.5 (38)

G304001 1.3 EXPANSION

Compensate for piping expansion by utilizing expansion loops and joints. Provide guided slip or flexible ball expansion joints.

G304001 1.4 SUPPORTS

MSS SP-58 and MSS SP-69, adjustable supports with insulation protection saddles. Provide stainless steel axles for rollers. Provide support poles with guy wires and hardware.

G304002 OVERHEAD STEAM SYSTEMS

G304002 1.1 PIPING & FITTINGS

G304002 1.1.1 Steam Piping

ASTM A 53, Type E (electric-resistance welded, Grade A or B) or Type S (seamless, Grade A or B), black steel. Provide Weight Class STD (Standard) for welding end connections. Provide Weight Class XS (Extra Strong) for threaded end connections. ASTM A 106, Grade A or B, black steel, Schedule 40 may be used for pipe sizes through 9 inches (250 mm), and minimum pipe wall thickness of 0.35 inches (9.5 mm) for pipe sizes 12 inches (300 mm) and larger for welding end connections. Provide Schedule 80 for threaded end connections.

G304002 1.1.2 Condensate Piping

ASTM A 53, Type E (electric-resistance welded), Grade A or B), or Type S (seamless, Grade A or B); black steel, Weight Class XS (Extra

Strong). ASTM A 106, Grade A or B, black steel, Schedule 80 may be used.

G304002 1.2 INSULATION

Fibrous glass, calcium silicate, or cellular glass pipe insulation with aluminum jacket which matches existing or surrounding insulation. Paint jacket to suit Base Architectural Plan. The minimum insulation thickness must be in accordance with the following tables:

Table 1 Insulation Thickness for Steam Systems

Nominal Pipe Diameterinches (mm)	Fibrous Glassinches (mm)	Calcium Silicateinches (mm)	Cellular Glassinches (mm)
1.00 (25)	3.5 (90)	4.0 (100)	*
1.5 (38)	3.5 (90)	4.0 (100)	*
2.0 (51)	3.5 (90)	4.0 (100)	*
2.5 (64)	3.5 (90)	4.0 (100)	*
3.0 (76)	4.0 (100)	4.5 (115)	*
4.0 (100)	4.0 (100)	4.5 (115)	*
5.0 (125)	4.5 (115)	5.0 (125)	*
6.0 (150)	4.5 (115)	5.0 (125)	*
8.0 (200)	5.0 (125)	6.0 (150)	*
10.0 (250)	5.0 (125)	6.0 (150)	*
12.0 (300)	5.0 (125)	6.0 (150)	*
14.0 (350)	5.0 (125)	6.0 (150)	*
16.0 (400)	5.0 (125)	6.0 (150)	*
18.0 (450)	5.0 (125)	6.0 (150)	*

* Cellular glass pipe insulation having an insulating efficiency not less than that of the specified thickness of calcium silicate may be provided.

Table 2 Insulation Thickness for Condensate Systems

Nominal Pipe Diameterinches (mm)	Mineral Fiberinches (mm)	Fibrous Glassinches (mm)

1.00 (25)	2.5 (64)	*
1.5 (38)	2.5 (64)	*
2.0 (51)	2.5 (64)	*
2.5 (64)	2.5 (64)	*
3.0 (76)	3.0 (76)	*
4.0 (100)	3.0 (76)	*
5.0 (125)	3.5 (90)	*
6.0 (150)	3.5 (90)	*
8.0 (200)	3.5 (90)	*
10.0 (250)	3.5 (90)	*
12.0 (300)	3.5 (90)	*
14.0 (350)	3.5 (90)	*
16.0 (400)	3.5 (90)	*
18.0 (450)	3.5 (90)	*

* Fibrous glass pipe insulation having an insulating efficiency not less than that of the specified thickness of mineral fiber may be provided.

G304002 1.3 EXPANSION

Compensate for piping expansion by utilizing expansion loops and joints. Provide guided slip or flexible ball expansion joints.

G304002 1.4 SUPPORTS

MSS SP-58 and MSS SP-69, adjustable supports with insulation protection saddles. Provide stainless steel axles for rollers. Provide support poles with guy wires and hardware.

G304003 UNDERGROUND HOT WATER SYSTEMS

G304003 1.1 PIPING & FITTINGS

Direct buried, factory pre-fabricated, pre-insulated, piping systems must consist of a service pipe with polyurethane insulation and a high-density polyethylene (HDPE) jacket. Provide factory fabricated fittings and components. Field insulation of fittings is not allowed.

G304003 1.2 INSULATION

The minimum insulation thickness must be in accordance with the following tables:

Table 1 Insulation Thickness for Drainable/Dryable Systems

Nominal Pipe Diameterinches (mm)	Parocinches (mm)	Epitherminches (mm)	Kaylo-10 Thermo-12 Super Caltempinches (mm)
1.00 (25)	2.0 (51)	2.5 (64)	4.0 (100)
1.5 (38)	2.0 (51)	2.5 (64)	4.0 (100)
2.0 (51)	2.5 (64)	3.5 (90)	4.5 (115)
2.5 (64)	2.5 (64)	3.5 (90)	4.5 (115)
3.0 (76)	3.0 (76)	4.0 (100)	5.0 (125)
4.0 (100)	3.0 (76)	4.0 (100)	5.0 (125)
5.0 (125)	3.0 (76)	4.0 (100)	5.0 (125)
6.0 (150)	3.5 (90)	4.5 (115)	5.5 (140)
8.0 (200)	3.5 (90)	4.5 (115)	5.5 (140)
10.0 (250)	4.0 (100)	5.0 (125)	6.0 (150)
12.0 (300)	4.0 (100)	5.0 (125)	6.0 (150)
14.0 (350)	4.0 (100)	5.0 (125)	6.0 (150)
16.0 (400)	4.0 (100)	5.0 (125)	6.0 (150)
18.0 (450)	4.0 (100)	5.0 (125)	6.0 (150)

Table 2 Insulation Thickness for Water Spread Limiting Systems

Nominal Pipe Diameterinches (mm)	Calcium Silicateinches (mm)	Polyurethaneinches (mm)
1.00 (25)	N/A	N/A
1.5 (38)	N/A	N/A
2.0 (51)	N/A	N/A
2.5 (64)	N/A	N/A

3.0 (76)	1.00 (25)	1.23 (31)
4.0 (100)	1.00 (25)	1.23 (31)
5.0 (125)	N/A	N/A
6.0 (150)	1.5 (38)	1.34 (34)
8.0 (200)	2.0 (51)	1.21 (30)
10.0 (250)	2.5 (64)	1.31 (33)
12.0 (300)	2.0 (51)	1.29 (33)
14.0 (350)	N/A	N/A
16.0 (400)	N/A	N/A
18.0 (450)	N/A	N/A

G304003 1.3 UHDS DESIGN

Design and provide direct buried, factory-prefabricated, pre-insulated main hot water piping, including piping in manholes. Asbestos cement or plastic conduit is not acceptable. The Underground Heat Distribution System (UHDS) representative must be certified in writing by the UHDS manufacturer to be technically qualified and experienced in the installation of the system. Provide a Certificate of Satisfactory Operation certifying that at least 3 systems installed by the UHDS manufacturer within the previous 10 years have and are operating satisfactorily for not less than 5 years. The certificate must include verification information.

G304003 1.4 VALVING

Provide isolation valves on supply and return lines at take-offs for service to each building. Locate valves in valve boxes. Valves must be ASME class 150.

G304003 1.5 EXPANSION

Compensate for piping expansion by utilizing expansion loops.

G304004 UNDERGROUND STEAM DISTRIBUTION SYSTEMS

G304004 1.1 PIPING & FITTINGS

Direct buried, factory pre-fabricated, pre-insulated, steam and condensate piping systems mustl consist of a steel service pipe with polyurethane insulation and a high-density polyethylene (HDPE) jacket. Provide factory fabricated fittings and components. Field insulation of fittings is not allowed.

G304004 1.2 INSULATION

The minimum insulation thickness must be in accordance with the following tables:

Table 1 Insulation Thickness for Drainable/Dryable Systems

Nominal Pipe Diameterinches (mm)	Parocinches (mm)	Epitherminches (mm)	Kaylo-10 Thermo-12 Super Caltempinches (mm)
1.00 (25)	2.0 (51)	2.5 (64)	4.0 (100)
1.5 (38)	2.0 (51)	2.5 (64)	4.0 (100)
2.0 (51)	2.5 (64)	3.5 (90)	4.5 (115)
2.5 (64)	2.5 (64)	3.5 (90)	4.5 (115)
3.0 (76)	3.0 (76)	4.0 (100)	5.0 (125)
4.0 (100)	3.0 (76)	4.0 (100)	5.0 (125)
5.0 (125)	3.0 (76)	4.0 (100)	5.0 (125)
6.0 (150)	3.5 (90)	4.5 (115)	5.5 (140)
8.0 (200)	3.5 (90)	4.5 (115)	5.5 (140)
10.0 (250)	4.0 (100)	5.0 (125)	6.0 (150)
12.0 (300)	4.0 (100)	5.0 (125)	6.0 (150)
14.0 (350)	4.0 (100)	5.0 (125)	6.0 (150)
16.0 (400)	4.0 (100)	5.0 (125)	6.0 (150)
18.0 (450)	4.0 (100)	5.0 (125)	6.0 (150)

Table 2 Insulation Thickness for Water Spread Limiting Systems

Nominal Pipe Diameterinches (mm)	Calcium Silicateinches (mm)	Polyurethaneinches (mm)
1.00 (25)	N/A	N/A
1.5 (38)	N/A	N/A
2.0 (51)	N/A	N/A
2.5 (64)	N/A	N/A

3.0 (76)	1.00 (25)	1.23 (31)
4.0 (100)	1.00 (25)	1.23 (31)
5.0 (125)	N/A	N/A
6.0 (150)	1.5 (38)	1.34 (34)
8.0 (200)	2.0 (51)	1.21 (30)
10.0 (250)	2.5 (64)	1.31 (33)
12.0 (300)	2.0 (51)	1.29 (33)
14.0 (350)	N/A	N/A
16.0 (400)	N/A	N/A
18.0 (450)	N/A	N/A

Table 3 Insulation Thickness for Condensate Return Systems

Nominal Pipe Diameterinches (mm)	Parocinches (mm)	Epitherminches (mm)	Kaylo-10 Thermo-12 Super Caltempinches (mm)
1.00 (25)	2.0 (51)	2.5 (64)	4.0 (100)
1.5 (38)	2.0 (51)	2.5 (64)	4.0 (100)
2.0 (51)	2.5 (64)	3.5 (90)	4.5 (115)
2.5 (64)	2.5 (64)	3.5 (90)	4.5 (115)
3.0 (76)	3.0 (76)	4.0 (100)	5.0 (125)
4.0 (100)	3.0 (76)	4.0 (100)	5.0 (125)
5.0 (125)	3.0 (76)	4.0 (100)	5.0 (125)
6.0 (150)	3.5 (90)	4.5 (115)	5.5 (140)
8.0 (200)	3.5 (90)	4.5 (115)	5.5 (140)
10.0 (250)	4.0 (100)	5.0 (125)	6.0 (150)
12.0 (300)	4.0 (100)	5.0 (125)	6.0 (150)
14.0 (350)	4.0 (100)	5.0 (125)	6.0 (150)
16.0 (400)	4.0 (100)	5.0 (125)	6.0 (150)

18.0 (450)	4.0 (100)	5.0 (125)	6.0 (150)

G304004 1.3 UHDS DESIGN

Design and provide direct buried, factory-prefabricated, pre-insulated main steam and condensate piping in separate conduits and including piping in manholes. Asbestos cement or plastic conduit is not acceptable. The UHDS representative must be certified in writing by the UHDS manufacturer to be technically qualified and experienced in the installation of the system. Provide a Certificate of Satisfactory Operation certifying that at least 3 systems installed by the UHDS manufacturer within the previous 10 years have and are operating satisfactorily for not less than 5 years. The certificate must include verification information.

G304004 1.4 VALVING

Provide isolation valves on supply and return lines at take-offs for service to each building. Locate valves in manholes. Valves must be ASME class 150.

G304004 1.5 EXPANSION

Compensate for piping expansion by utilizing expansion loops. Locate anchors outside manholes.

G304005 REINFORCED CONCRETE MANHOLES & VALVE BOXES

G304005 1.1 MANHOLE CONSTRUCTION

Manholes must be constructed of reinforced, 3000 psi (206.8 bar) concrete and extend a minimum of 6 inches (300 mm) above grade. Depth must be as required to maintain proper pipe slopes. Construct manhole floor and sides in one monolithic pour. Provide galvanized steel or sectioned aluminum, open grate or solid cover as indicated in ESR Section G30. Provide ventilation openings for solid cover. Provide steel ladder with non-slip surfaces and anchored to the wall. Manhole floor and walls must be watertight. Provide sleeves or core drill openings for pipes with modular mechanical seals. Provide sump pit for pump.

G304005 1.2 VALVE BOX CONSTRUCTION

Cast-iron or ductile-iron box of a suitable size. Provide cast-iron or ductile-iron cover for the box with word(s) describing the utility cast on the cover.

G304005 1.3 MANHOLE SUMP PUMPS

Vertical sump pump. Operating temperature design must be 195 degrees F (93 degrees C) minimum. Provide with 2-pole float control.

G304090 OTHER HEATING DISTRIBUTION

G304090 1.1 WARNING & IDENTIFICATION TAPE

Polyethylene plastic tape manufactured specifically for warning and identifying buried utility lines. Warning tape to be color coded with warning and identification of utility type imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (utility type) LINE BELOW" or similar wording. Color to be white for steam systems.

G304090 1.2 CORROSION PROTECTION

Provide a cathodic protection system for the underground piping system. System must be designed by a National Association of Corrosion Engineers (NACE) certified Cathodic Protection Engineer. The corrosion engineer must obtain soil data and existing system conditions. Corrosion engineer must supervise, inspect and test the installation and performance of the cathodic protection system. Test stations must be post mounted and placed at the manhole or nearby building. Test stations must be located at each end of each cathodically protected section.

G3050 COOLING DISTRIBUTION

G305001 OVERHEAD COOLING SYSTEMS

G305001 1.1 PIPING & FITTINGS

G305001 1.1.1 Chilled and Condenser Water Piping

Chilled and condenser water piping must be electric resistance welded or seamless Schedule 40 black steel pipe conforming to ASTM A 53. Piping 4 inch (100 mm) and smaller may be ASTM B 88 Type K or L copper.

G305001 1.1.2 Steel Pipe Fittings

For piping 2 inch (50 mm) and smaller, provide ANSI/ASME B16.3 malleable iron screwed fittings or ASME B16.11 socket welding (Class 3000) or threaded type (Class 2000). Provide ASME/ANSI B16.9 butt-welding fittings or ASME/ANSI B16.5 flanged type for piping 2-1/2 inch (63 mm) and larger. Grooved joint pipe coupling systems of appropriate pressure rating are acceptable in lieu of welded or screwed fittings.

G305001 1.1.3 Copper Fittings

Provide ANSI B16.18 cast bronze solder joint type or ASME/ANSI B16.22 wrought copper solder joint type.

G305001 1.2 INSULATION

Mineral fiber, Urethane, cellular glass, Faced Phenolic Foam, or Flexible Cellular pipe insulation with aluminum jacket in accordance with ESR Section G30. The minimum insulation thickness must be in accordance with the following table:

Table 1 Insulation Thickness for Cold Water Systems

Nominal Pipe Diameterinches (mm)	Mineral Fiberinches (mm)	Urethaneinches (mm)	Cellular Glassinches (mm)	Faced Phenolic Foaminches (mm)	Flexible Cellularinches (mm)
1.00 (25)	1.00 (25)	0.75 (19)	1.5 (38)	1.00 (25)	0.75 (19)
1.5 (38)	1.00 (25)	0.75 (19)	1.5 (38)	1.00 (25)	0.75 (19)
2.0 (51)	1.00 (25)	0.75 (19)	1.5 (38)	1.00 (25)	0.75 (19)
2.5 (64)	1.00 (25)	0.75 (19)	1.5 (38)	1.00 (25)	0.75 (19)
3.0 (76)	1.00 (25)	0.75 (19)	1.5 (38)	1.00 (25)	0.75 (19)
4.0 (100)	1.5 (38)	0.75 (19)	1.5 (38)	1.00 (25)	0.75 (19)
5.0 (125)	1.5 (38)	0.75 (19)	1.5 (38)	1.00 (25)	0.75 (19)
6.0 (150)	1.5 (38)	1.00 (25)	1.5 (38)	1.5 (38)	1.00 (25)
8.0 (200)	1.5 (38)	1.00 (25)	1.5 (38)	1.5 (38)	1.00 (25)
10.0 (250)	1.5 (38)	1.00 (25)	1.5 (38)	1.5 (38)	1.00 (25)
12.0 (300)	1.5 (38)	1.00 (25)	1.5 (38)	1.5 (38)	1.00 (25)
14.0 (350)	1.5 (38)	1.00 (25)	1.5 (38)	1.5 (38)	1.00 (25)
16.0 (400)	1.5 (38)	1.00 (25)	1.5 (38)	1.5 (38)	1.00 (25)
18.0 (450)	1.5 (38)	1.00 (25)	1.5 (38)	1.5 (38)	1.00 (25)

G305001 1.3 SUPPORTS

Provide MSS SP-58 and MSS SP-69, adjustable supports with insulation protection saddles. Provide stainless steel axles for rollers. Provide support poles with guy wires and hardware.

G305001 1.4 EXPANSION

Compensate for piping expansion by utilizing expansion loops and joints. Provide guided slip or flexible ball expansion joints.

G305002 UNDERGROUND COOLING SYSTEMS

G305002 1.1 PIPING & FITTINGS

Direct buried, factory-prefabricated, pre-insulated, chilled water piping systems. Fittings and accessories must be designed and factory-fabricated to prevent moisture from entering into the system. Backfill and install to meet the requirements of the piping system manufacturer.

G305002 1.2 VALVES

Provide isolation valves on supply and return lines at take-offs for service to each building. Locate valves in valve boxes.

G305090 OTHER COOLING DISTRIBUTION

G305090 1.1 EXPANSION

Compensate for piping expansion by utilizing expansion loops. Locate anchors outside manholes.

G305090 1.2 WARNING & IDENTIFICATION TAPE

Polyethylene plastic tape manufactured specifically for warning and identifying buried utility lines. Warning tape to be color coded with warning and identification of utility type imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (utility type) LINE BELOW" or similar wording.

G305090 1.3 CORROSION PROTECTION

Provide a cathodic protection system for the underground chilled water and condenser water piping system. System must be designed by a National Association of Corrosion Engineers (NACE) certified Cathodic Protection Engineer. The corrosion engineer must obtain soil data and existing system conditions. Corrosion engineer must supervise, inspect and test the installation and performance of the cathodic protection system. Test stations must be post mounted and placed at the manhole or nearby building. Test stations must be located at each end of each cathodically protected section.

G3060 FUEL DISTRIBUTION

G306006 GAS DISTRIBUTION PIPING (NATURAL & PROPANE)

G306006 1.1 STEEL PIPE

Gas piping must be ASTM A 53, Type E (electric-resistance welded, Grade A or B) or Type S (seamless, Grade A or B), black steel. Provide Weight Class STD (Standard) for welding end connections. Provide Weight Class XS (Extra Strong) for threaded end connections.

G306006 1.2 POLYETHYLENE (PE)

PE pipe and heat fusion fittings must conform to ASTM D 2513, Grade PE2406 or PE3408.

G306007 GAS STORAGE TANKS

G306007 1.1 PROPANE STORAGE TANKS

ASME labeled tank in accordance with NFPA 58 with a capacity to meet the system requirements.

G306009 OTHER GAS DISTRIBUTION

G306009 1.1 WARNING & IDENTIFICATION TAPE

Detectable aluminum foil, plastic backed tape or detectable magnetic plastic tape manufactured specifically for warning and identifying buried piping. Warning tape to be color coded with warning and identification of utility type imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (utility type) LINE BELOW" or similar wording. Color to be yellow for gas lines.

-- End of Section --

SECTION G40

SITE ELECTRICAL UTILITIES
09/22

G40 GENERAL

RFP Part 3 including the Engineering System Requirements (ESR) provide project specific requirements. The RFP Part 4, Performance Technical Sections (PTS) provide generalized technical requirements that apply to multiple facility types and include more requirements than are applicable to any one project. Therefore, only the RFP Part 4 requirements that apply to the project and further define the RFP Part 3 project specific requirements are required.

G40 1.1 NARRATIVE

This section covers installations exterior to the facility outside the five foot line. See PTS Section D50, *Electrical*, for continuation of systems inside the five foot line, into and inside the building.

G40 1.2 ELECTRICAL DESIGN GUIDANCE

Provide the design and installation in accordance with the following references. This Performance Technical Specification (PTS) adds clarification to the fundamental requirements contained in the following Government Standards. The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification*.

When all product Quality Control information is included in the Unified Facility Criteria (UFC) and there are requirement options identified in the ESR, then the Uniformat Level 4 titles (and possible subtitles) are included without repetition of requirements. One example of this is G401008, GROUNDING SYSTEMS.

G40 1.2.1 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	General Building Requirements(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s):UFC 3-501-01, Electrical Engineering)
UFC 1-200-02	High Performance and Sustainable Building Requirements
UFC 3-570-02N	Electrical Engineering Cathodic Protection

UNIFIED FACILITIES GUIDE SPECIFICATIONS (UFGS)

UFGS 26 12 19.10	Three-Phase, Liquid-Filled Pad-Mounted Transformers
UFGS 26 12 21	Single-Phase Pad-Mounted Transformers
UFGS 26 13 00	SF6/High-Firepoint Fluids Insulated Pad-Mounted Switchgear
UFGS 26 27 14.00 20	Electricity Metering
UFGS 26 56 00	Exterior Lighting
UFGS 33 71 01	Overhead Transmission and Distribution
UFGS 33 71 02	Underground Electrical Distribution
UFGS 33 82 00	Telecommunications Outside Plant (OSP)

G40 1.3 QUALITY ASSURANCE

Submit qualifications, certifications, and Test Plans indicated herein 45 calendar days prior to the expected date of execution. Notify the Contracting Officer 14 calendar days prior to all testing. Submit test results within 7 calendar days of completion of testing.

The Designer of Record is responsible for approving the submittals listed below.

G40 1.3.1 Qualified Testing Organization

Engage the services of a qualified testing organization to provide inspection, testing, calibration, and adjustment of the electrical distribution system and equipment listed in paragraph entitled "Acceptance Tests and Inspections" herein. Organization must be independent of the supplier, manufacturer, and installer of the equipment. The organization must be a first tier subcontractor.

a. Submit name and qualifications of organization. Organization must have been regularly engaged in the testing of electrical materials, devices, installations, and systems for a minimum of 5 years. The organization must have a calibration program, and test instruments used must be calibrated in accordance with NETA ATS.
b. Submit name and qualifications of the lead engineering technician performing the required testing services. Include a list of three comparable jobs performed by the technician with specific names and telephone numbers for reference. Testing, inspection, calibration, and adjustments must be performed by an engineering technician, certified by NETA or the National Institute for Certification in Engineering Technologies (NICET) with a minimum of 5 years' experience inspecting,

testing, and calibrating electrical distribution and generation equipment, systems, and devices.

G40 1.3.2 NEC Qualified Worker

Provide in accordance with NFPA 70. Qualified Workers are allowed to be assisted by helpers on a 1 to 1 ratio, provided such helpers are registered in recognized apprenticeship programs. Submit a certification confirming NEC Qualified Worker requirements.

G40 1.3.3 Qualified Medium Voltage Electrician

All workers on medium voltage electrical crews must have 5 years experience working medium voltage systems on similar projects involving the same or higher voltage.

G40 1.3.4 Qualified Cable Splicer (Medium Voltage Cable)

The cable splicer/terminator must have a certification from the National Cable Splicing Certification Board (NCSCB) in the field of splicing and terminating shielded medium voltage (5 kV to 35 kV) power cable using pre-manufactured kits (pre-molded, heat-shrink, cold-shrink). Submit proof of certification for the individuals that will be performing cable splicer and termination work 30 days before splices or terminations are to be made.

G40 1.3.5 Qualified PV Installer

Installation of photovoltaic systems must be performed by experienced and trained installers. At minimum the PV installation supervisor must hold a "PV Installer Certification" as issued by the North American Board of Certified Energy Practitioners or hold a Certified Solar Roofing Professional (CSRP) credential issued by RISE "Roof Intergrated Solar Energy Inc".

G40 1.3.6 Qualified Cable Splicer (Telecommunications)

Certification must include the training, and experience of the individual on specific type and classification of telecommunications cable to be provided under this contract.

G40 1.3.7 Qualified Cable Installer and Splicer (Fiber Optic Cable)

Certification must include the training, and experience of the individual on specific type and classification of Fiber Optic media to be provided under this contract.

G40 1.3.8 Qualified Fiber Optic (FO) Cable Manufacturer

The FO media manufacturer must have a minimum of 3 years experience in the manufacturing, assembly, and factory testing of FO media that complies with RUS REA Bull 1753F-601 (PE-90). Manufacturer must provide a list of customers with 3 years of maintenance logs documenting experience with government customers.

G40 1.3.9 Material Standards

Ensure service support and provide manufacturer's nameplate in accordance with PTS Section Z10, *General Performance Technical Specification*.

G40 1.3.9.1 Warning Labels

Each enclosure of electrical equipment, including substations, pad-mounted transformers, pad-mounted switches, pad-mounted sectionalizing termination cabinets, and switchgear, must have a warning label identifying the enclosure as 1) containing energized electrical equipment and 2) an arc flash hazard. Provide arc flash warning labels in accordance with UFC 3-560-01, *Electrical Safety, O & M*.

G40 1.3.10 Factory Testing

The Government reserves the right to witness all factory testing. The manufacturer's calibration program must ensure that all test instruments are maintained within rated accuracy.

G40 1.3.11 Electrical System Startup and Testing

Submit test plans for approval. Tailor test plans to the systems provided.

The test plan must list make and model and provide functional description of the test instruments and accessories and must describe the setup of the tests to be conducted. Test instruments mustl be capable of measuring and recording or displaying test data at a higher resolution and greater accuracy than specified for the equipment's performance.

G40 1.3.11.1 Factory Trained Engineer

Provide a factory trained engineer to supervise start-up and testing as required in referenced specifications.

G40 1.3.11.2 Performance Verification Testing

Perform in-service demonstration that all circuits and devices are in operating condition. Tests must confirm that each item of control equipment will function not less than five times. Provide all necessary test equipment, tools, fuel, load banks, labor, and materials for testing. As a minimum, test all systems in accordance with manufacturer's recommendations. Additional testing requirements for the various systems are described with those systems, hereinafter. Assure that all test instruments are maintained within rated accuracy. Dated calibration labels must be visible on all test equipment.

Submit a separate electrical field test plan in accordance with manufacturer's recommendations and that conforms to NETA ATS for each piece of Electrical Distribution Equipment and System requiring Performance Verification Testing.

The following items identify specific test requirements. Additional test requirements are contained in the applicable UFGS.

a. Cable – Test cable in accordance with the manufacturer's recommendations and NETA ATS. Adhere to precautions and limits as specified in the applicable NEMA/ICEA Standard for the specific cable.
b. Grounding - Test ground systems in accordance with the manufacturer's recommendations and NETA ATS.
c. Site Lighting - Contractor's Quality Control (CQC) representative must perform a field survey of site lighting systems in accordance with IESNA for acceptance. Show that the lighting system operates in accordance with the user's requirements and is in accordance with designed levels. Provide certification that the measured lighting levels conform to the design requirements.
d. Telecommunications wiring - Test all cables in accordance with industry standards.

G40 1.3.11.3 Acceptance Tests and Inspections

The Qualified Testing Organization must provide the Acceptance Tests and Inspections test plan and procedures and perform the acceptance tests and inspections. Test methods, procedures, and test values must be performed and evaluated in accordance with NETA ATS, the manufacturer's recommendations, and paragraph entitled "Field Quality Control" of each applicable specification section. Tests identified as optional in NETA ATS are not required unless otherwise specified. Place equipment in service only after completion of required tests and evaluation of the test results have been completed. Contractor must supply to the testing organization complete sets of shop drawings, settings of adjustable devices, and other information necessary for an accurate test and inspection of the system prior to the performance of any final testing.

Specific test requirements are contained in the UFGS for equipment.

G40 1.4 DESIGN SUBMITTALS

Submit design submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, FC 1-300-09N, *Navy and Marine Corps Design Procedures*, and UFC 3-501-01, *Electrical Engineering*.

In addition, UFGS sections listed below or in the body of the PTS text are to be used by the Designer of Record (DOR) as a part of the design submittal. If the UFGS products or systems are applicable to the project, the DOR must edit these referenced UFGS sections and submit them as a part of the design submittal specification. Edit the specification sections in accordance with the limitations stated in PTS Section Z10, *General Performance Technical Specifications*.

UFGS 26 11 13.00 20, *Primary Unit Substation*

UFGS 26 11 16, *Secondary Unit Substations*

UFGS 26 12 19.10, *Three-Phase, Liquid-Filled Pad-Mounted Transformers*

UFGS 26 12 21, *Single-Phase Pad-Mounted Transformers*

UFGS 26 13 00, *SF6/High-Firepoint Fluids Insulated Pad-Mounted Switch Gear*

UFGS 26 23 00, *Low-Voltage Switchgear*

UFGS 26 24 13, *Switchboards*

UFGS 26 27 14.00 20, *Electricity Metering*

UFGS 26 56 00, *Exterior Lighting*

UFGS 33 71 01, *Overhead Transmission and Distribution*

UFGS 33 71 02, *Underground Electrical Distribution*

UFGS 33 82 00, *Telecommunications Outside Plant (OSP)*

G40 1.4.1 Sustainable Design Submittal

Submit sustainable design submittals in accordance with Part 2 UFGS Section 01 33 29, *Sustainability Requirements and Reporting*.

G40 1.5 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*. In addition to the PTS Section Z10 requirements, the Designer of Record (DOR) ,ust approve the following construction submittals as a minimum:

OMSI Information for Electrical Equipment (if OMSI Manual for the entire project is not already required); all "G" item submittals listed in the submittals of the specifications sections identified in the Design Submittals paragraph above; and all "G" item submittals listed for Government Surveillance in Part 2 Section 01 33 00.05 20, *Construction Submittal Procedures*.

Provide certification that all adjustable protective device settings have been set in accordance with the coordination study for the as-built equipment and configuration.

G40 1.5.1 Sustainable Construction Submittal

Submit sustainable construction submittals in accordance with Part 2 UFGS Section 01 33 29, *Sustainability Requirements and Reporting*.

G4010 ELECTRICAL DISTRIBUTION

G401002 TRANSFORMERS

When transformers are required, the Designer of Record must utilize UFGS Section 26 12 19.10, *Three-Phase, Liquid-Filled Pad-Mounted Transformers*, UFGS Section 26 12 21, *Single-Phase Pad Mounted Transformers*, or UFGS Section 33 71 01, *Overhead Transmission and Distribution*, for the project specification, and submit the edited specification section as a part of the design submittal for the project.

G401003 SWITCHES, CONTROLS AND DEVICES

When switches or control devices are required, the Designer of Record must utilize UFGS Section 26 13 00, *SF6/High-Firepoint Fluids Insulated Pad Mounted Switchgear*, or UFGS Section 33 71 01, *Overhead Transmission and Distribution*, for the project specification, and submit the edited specification section as a part of the design submittal for the project.

G401004 OVERHEAD ELECTRIC CONDUCTORS

Power line conductors must be strung in accordance with manufacturer's standard sag and tension recommendations.

G401005 TOWERS, POLES, CROSSARMS AND INSULATORS

Wood poles must comply with ANSI 05.1 and RUS 1728F-700. Pressure treat poles in accordance with AWPA C1 and AWPA C4 as referenced in RUS 1728F-700. The quality of each pole must be ensured with "WQC" (wood quality control) brand on each piece or by an approved inspection agency report. Do not use creosote treated poles, lodgepole pine, and western larch pine poles.

Concrete poles must comply with ANSI loadings for distribution poles.

Determine the size of poles required, class, height and other data, to meet requirements of the pole line. Provide wood, steel, or fiberglass crossarms in accordance with industry and local standards. Insulators, cutouts and associated equipment must be determined by the Designer of Record to meet system requirements.

G401006 UNDERGROUND ELECTRIC CONDUCTORS

Route underground cables to minimize splices. Cable pulling tensions must not exceed the maximum pulling tension recommended by the cable manufacturer. Medium voltage cable termination must be suitable for the location installed and meet IEEE Std. 48 Class 1 requirements.

G401007 DUCTBANKS, MANHOLES, HANDHOLES AND RACEWAYS

Concrete manholes and handholes to be standard type precast concrete. Composite/Fiberglass handholes must be polymer concrete reinforced with a heavy weave fiberglass reinforcing. Provide manholes and handholes with load ratings suitable for the location installed.

G401008 GROUNDING SYSTEMS

G401009 METERING

When metering is required the Designer of Record must utilize UFGS section 26 27 14.00 20 for the project specification and submit the edited specification section as part of the design submittal for the project.

G401011 EQUIPMENT REQUIREMENTS FOR COASTAL AND HIGH HUMIDITY AREAS

G4020 SITE LIGHTING

G402001 EXTERIOR LIGHTING FIXTURES AND CONTROLS

Comply with ANSI/ASHRAE/IES 90.1 for all exterior lighting applications and controls. Comply with UFC 3-530-01 for reduction of light pollution.

Provide SPD at panelboards that include circuits feeding exterior lighting systems.

Coordinate the design and luminaire selection with the landscape designer. Such coordination must ensure the location of poles do not conflict with tree locations.

When exterior lighting is required the Designer of Record must utilize UFGS section 26 56 00 for the project specification and submit the edited specification section as part of the design submittal for the project.

G402002 SPECIAL SECURITY LIGHTING SYSTEM

G402003 OTHER AREA LIGHTING

G402004 LIGHTING POLES

Poles must meet International Building Code for street lighting poles, and AASHTO loadings for highway and sports lighting poles taking into account the effective projected areas of the luminaries provided. Provide direct set or anchor-base type poles designed for use with underground supply conductors.

G402005 UNDERGROUND ELECTRIC CONDUCTORS

Provide in accordance with Paragraph G401006.

G402006 DUCTBANKS, MANHOLES AND HANDHOLES

Provide handholes and underground conduits for site lighting in accordance with Paragraph G401007.

G402007 GROUNDING SYSTEMS

G4030 SITE COMMUNICATION

G403001 TELECOMMUNICATIONS SYSTEMS

G403002 CABLE TV SYSTEMS (CATV)

G403003 CABLES AND WIRING

Provide underground copper cable pair in accordance with RUS 345-67. Provide aerial cable in accordance with RUS 345-67 except that it must be suitable for aerial installation and must be Figure 8 distribution wire with 6,000 pound (26,700 N) Class A galvanized steel or 6,000 pound (26,700 N) aluminum-clad steel strand. Screen-compartmental core cable must be filled cable meeting the requirements of RUS 345-67. Fiber optic media must meet all performance requirements of EIA/TIA-568-A and the physical requirements of ICEA S 87-640 and EIA/TIA-598-A.

G403004 DUCTBANKS, MANHOLES AND HANDHOLES

Provide in accordance with paragraph G401007.

G403005 TOWERS, POLES AND STANDS

Provide in accordance with paragraph G401005.

G403007 ELECTRONIC SECURITY SYSTEM (ESS)

G403008 OTHER COMMUNICATION AND ALARM

G403009 GROUNDING SYSTEMS

G403010 INDUSTRIAL CONTROL SYSTEMS (ICS)

G4090 OTHER ELECTRICAL UTILITIES

G409007 PHOTOVOLTAIC ENERGY SYSTEM

When a photovoltaic system is required, provide a grid tied, photovoltaic system, including structural support system, crystalline photovoltaic panels, combiner boxes, and inverters. The Designer of Record must utilize UFGS Section 26 31 00 for the project specification, and submit the edited specification section as a part of the design submittal for the project.

G409007 1.1 CODES AND STANDARDS

Provide PV system hardware and services that meet or exceed all applicable local, State and utility requirements, conform to the applicable codes and standards, and have passed the listing and qualification tests, listed below. (Comply with the most recent version of each document).

a. IEEE 1262 "Recommended Practice for Qualification of Photovoltaic Modules".
b. PowerMark certification for PV modules.
c. IEEE Standard 928-1986, Recommended Criteria for Terrestrial Photovoltaic Power Systems (PV system performance criteria).
d. IEEE 1547 Standard for Interconnecting Distributed Resources with Electric Power Systems.
e. Underwriters Laboratories 1741 (UL Standard for Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources).
f. Underwriters Laboratories 1703 (UL Standard for Listing Photovoltaic Modules).
g. Certification of PV Equipment: All PV modules, inverters, and electrical components are required to be listed or recognized by an appropriate and recognized United States Safety Laboratory (for example: UL or ETL).

G409007 1.2 PHOTOVOLTAIC APPLICATION ANALYSIS

Provide a comprehensive "Photovoltaic Application Analysis" with a detailed description of system, application, site shading conditions and expected kW output of the photovoltaic application. Utilize the

Solmetric Suneye or the Solar Pathfinder shading analyzers to analyze the effects of the existing site shading conditions. Include estimated PV output in kWh per year in the analysis.

G409007 1.3 TECHNICAL REQUIREMENTS

Work responsibilities include at a minimum: system design, equipment selection, and PV system installations. Provide system individually capable of providing peak power output of at least proposed PV system size, 208 or 480 volt, 3-phase, 4-wire power.

The final System configuration must allow automatic operation without operator intervention. Design system and specify equipment to minimize maintenance requirements. System must include metering that is integrated with current AMI network (Advanced Metering Infrastructure) and planned energy metering projects.

Locate inverter(s) disconnects and associated electrical equipment in an area that is accessible, weather-protected, and secure from vandalism and personal injury.

Mount disconnects and over current devices in approved boxes, enclosures, or panel boards. Provide DC rated disconnects and switches when used in DC applications. Bond metal enclosures and boxes to the grounding conductor.

At a minimum, electrical meters must capture the following data on individual system performance (minimum solar irradiance, DC power, AC real power, AC current, AC voltage, and power factor (recommend ION 8600 for AC); ambient air temperature, PV cell temperature, kW, and kWh). This data must be captured at hourly intervals for a minimum one year. Units of temperature, power, and current must be in Fahrenheit, Watts, and Amps respectively.

Transformers, if required, must have a minimum efficiency based on factory test results of not less than the efficiency indicated in 10 CFR 431, Subpart K, paragraph 431.196(b). Transformers must be housed in NEMA 4X enclosures.

Mounting structures must be corrosion resistant to marine environment.

Provide permanent plaque or directory at each building service and power source identifying all other building services and power sources.

-- End of Section --

SECTION Z10

GENERAL PERFORMANCE TECHNICAL SPECIFICATION
09/22

Z10 GENERAL

RFP Part 3 including the Engineering System Requirements (ESR) provide project specific requirements. The RFP Part 4, Performance Technical Sections (PTS) provide generalized technical requirements that apply to multiple facility types and include more requirements than are applicable to any one project. Therefore, only the RFP Part 4 requirements that apply to the project and further define the RFP Part 3 project specific requirements are required.

Z10 1.1 NARRATIVE

All Performance Technical Specification (PTS) sections must be used in conjunction with all parts of the Design Build (D/B) Request for Proposal (RFP) to determine the full requirements of this solicitation. This PTS section provides general requirements for the other PTS sections of this RFP and is used in conjunction with the other PTS sections.

Refer to Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*for the Order of Precedence of the RFP Parts. Requirements listed in the Project Program take precedence over the PTS sections requirements; therefore, requirements identified in the Project Program eliminate options related to that requirement in the PTS sections.

Z10 1.2 DESIGN GUIDANCE

Provide work in compliance with the following design standards and codes, as a minimum. Government standards listed in this RFP take precedence over industry standards.

The PTS Sections reference published standards, the titles of which can be found in the *Unified Master Reference List (UMRL)*on the Whole Building Design Guide at the Unified Facilities Guide Specification (UFGS) Website . The publications referenced form a part of this specification to the extent referenced. The publications are referred to in the section text by the basic designation only. Industry standards, codes, and Government standards referenced in the section text, and not found in the UMRL, are listed at the beginning of the PTS sections.

The advisory provisions of all referenced codes, standards, and specifications must be mandatory; substitute words such as "must", or "required" for words such as "should", "may", or "recommended," wherever they appear. The results of these wording substitutions incorporate these code and standard statements as requirements. Reference to the "authority having jurisdiction" for variance from criteria must be interpreted to mean the "Chief Engineer, NAVFAC" and for contractual obligations on this project must be interpreted to mean the "Contracting Officer". Comply with the required and advisory portions of the current edition of the standard at the time of contract award.

The following list of codes and standards is not comprehensive and is

augmented by other codes and standards referenced and cross-referenced in the RFP.

Z10 1.2.1 INDUSTRY CODES

INTERNATIONAL BUILDING CODE (IBC) as modified by UFC 1-200-01. UFC 1-200-01 applies the IBC to the project and references other commercial standards and UFC criteria that become part of the contract.

Z10 1.2.2 INDUSTRY REQUIREMENTS

WHOLE BUILDING DESIGN GUIDE (WBDG)

WHOLE BUILDING DESIGN GUIDE, Ensure Occupant Safety and Health (Systems Safety Engineering) at https://www.wbdg.org/design-objectives/secure-safe/occupant-safety-health

Z10 1.2.3 GOVERNMENT STANDARDS

Z10 1.2.3.1 UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (UFC 1-200-01 is a hub document that provides general building requirements and references other critical UFCs. A reference to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs listed therein.)
UFC 1-200-02	High Performance and Sustainable Building Requirements
FC 1-300-09N	Navy and Marine Corps Design Procedures

Z10 1.2.3.2 FEDERAL STANDARDS

Architectural Barriers Act Standards with DEPSECDEF Memorandum 31 Oct 2008, "Access for People with Disabilities"

Occupational Safety and Health Administration (OSHA)

Z10 1.3 MATERIALS AND EQUIPMENT REQUIREMENTS IDENTIFICATION

Z10 1.3.1 MATERIALS STANDARD

Refer to the Project Program for identification of Government Furnished Equipment.

The equipment items must be supported by service organizations that are convenient to the equipment installation in order to render satisfactory service to the equipment on a regular and emergency basis

during the warranty period of the contract.

Materials, equipment, fixtures, and other appurtenances must comply with applicable Underwriters Laboratories, (UL) Inc., American National Standards Institute, Inc., and National Electrical Manufacturer's Association standards or applicable standards of a similar independent testing organization. All materials must be new, and must bear the label of Underwriters Laboratories whenever standards have been established and label service is normally and regularly furnished by the agency. All equipment provided must be listed and labeled suitable for the specified purpose, environment, and application and installed in accordance with manufacturer's recommendations. Insulation must be asbestos free.

Z10 1.3.2 EQUIPMENT NAMEPLATE IDENTIFICATION

Each item of equipment must have a nameplate bearing the manufacturer's name, address, model number, and serial number securely affixed in a conspicuous place. The nameplate of the distributing agent will not be acceptable.

Z10 1.3.3 FIELD-APPLIED NAMEPLATES

Provide laminated plastic nameplates for each piece of equipment. Each nameplate must identify the function and, when applicable, the number designation of that piece of equipment as used in the design documents. Provide melamine plastic nameplates, 0.125 inch (3 mm) thick, white with black center core.

Z10 1.4 COMMISSIONING

Commission the building systems identified in Part 3 Chapter 2.0 "Project Objectives", paragraph titled "Building Commissioning". Refer to Part 2 Section 01 45 00.05 20, *Design and Construction Quality Control*for the Commissioning Authority's required qualifications and responsibilities and comply with UFGS 01 91 00.15 20, *Total Building Commissioning*modified as necessary to include all applicable systems included in the final design. Test reports must be certified by the Commissioning Authority (CA), that work is in compliance with requirements of the RFP.

Z10 1.5 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTS

Verification of satisfactory construction and system performance must be via Performance Verification Testing, Acceptance Tests, and submittal of test reports certified by the Designer of Record (DOR), that work is in compliance with requirements of the RFP. The Government reserves the right to witness all Performance Verification and Acceptance Tests, review data, and request other such additional inspections and repeat tests as necessary to ensure that the work and provided services conform to the stated requirements. Contractor must pay the cost of all testing.

Refer to each PTS section to identify Performance Verification and Acceptance Testing required by the work specified in that PTS section.

Z10 1.6 SUBMITTALS

Contractor's design submittals that combines design and construction submittals, must jointly comply with Part 2 Sections 01 33 00.05 20, *Construction Submittal Procedures*and 01 33 10.05 20, *Design Submittal Procedures*. Contractor's construction submittals that are submitted separate from the design submittals must comply with Part 2 Section 01 33 00.05 20, *Construction Submittal Procedures*.

Refer to "Construction Quality Control" in Part 2 Sections 01 33 00.05 20, *Construction Submittal Procedures*and 01 45 00.05 20, *Design and Construction Quality Control*to define reviewing and approving Authority of design and construction submittals.

Utilize the same materials and equipment that are approved and provided for an initial facility design, on all follow-on facilities that use the same design with-in this contract. Once the initial facility design is approved by the Government, the Contractor must obtain Government approval to change materials and equipment when designing and constructing follow-on facilities utilizing the same design.

Z10 1.6.1 DESIGN SUBMITTALS

Submit design submittals in accordance with Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, FC 1-300-09N, *Navy and Marine CorpsDesign Procedures*, and other discipline-specific guidelines listed in the applicable PTS sections.

Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*requires the use of UFGS sections in the development of the Contractor originated specification. The Designer of Record (DOR) must edit the UFGS sections for the project and submit the edited specification as a part of the design submittal. The DOR must edit the UFGS as follows:

(1) Prepare UFGS Specifications as part of the project specification,

(2) Delete only portions of the UFGS specification that are not applicable to the project,

(3) Edit only the bracketed choices that are within the UFGS specification text,

(4) Edit blank bracketed options to include requirements that exercise prudence and adherence to acceptable industry standards,

(5) Comply with the directions, directives, and requirements of all UFGS Criteria Notes. The UFGS Criteria Notes are typically bordered on the top and bottom by a line of asterisks to highlight their location.

(6) If proprietary information is provided or required to streamline the construction submittal process, include proprietary information in the edited UFGS sections and added to the end of each UFGS section. Confirm that the proprietary products, materials, and systems listed in the specifications are in compliance with the requirements of the RFP.

Z10 1.6.2 CONSTRUCTION SUBMITTALS

Submit for approval to the Designer of Record (DOR), construction submittals, product data, manufacturer's information, shop drawings, and test reports on all materials and systems installed in the project, unless the DOR designates submittal for QC approval. Refer to each PTS section for further construction submittal requirements relating to the work identified in that particular PTS section. Some PTS sections reference UFGS sections that will require more construction submittals for DOR approval than is stated above. Refer to Part 2 Section 01 33 00.05 20 for the list of construction submittals reserved for Government Approval and Government Surveillance.

--End of Section--

Naval Facilities Engineering Systems Command
NAVFAC Southwest

RFP N62473-23-R-1012
C&I MACC

PTO 0001
BACHELOR ENLISTED QUARTERS
MCB SAN DIEGO, CA

PART 5

Prescriptive Specifications
(Not Used)

Naval Facilities Engineering Systems Command

NAVFAC Southwest

RFP N62473-23-R-1012
C&I MACC

PTO 0001
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MCB SAN DIEGO, CA

PART 6

Attachments

Naval Facilities Engineering Systems Command

NAVFAC Southwest

RFP N62473-23-R-1012
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PTO 0001
BACHELOR ENLISTED QUARTERS
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PART 6

Attachment A

Site Map