eProjects
Work Order Number:
796554

Appropriation: MCON

MESS HALL

FRENCH CREEK

At

MCB Camp Lejeune, NC

(P-1267)

DESIGNED BY:

NAVFAC MID-ATLANTIC
9742 MARYLAND AVENUE
NORFOLK, VIRGINIA 23511-3095

DESIGN PREPARED BY:

Architectural:	Gyasi Cooke, R.A.
Civil:	Craig Hooper, P.E., LEED AP
Structural:	Paul Johnson III, E.I.T.
Mechanical:	Weldon Saunders, P.E.
Electrical:	Janice Fishburn, E.I.T.
Fire Prot.:	Brian Carnazza
Geotechnical:	Donald Petteway, P.E., LEED AP
Interior Design:	Rosemary Gray, NCIDQ
Specification:	Arthur Perrone

Date: June 30, 2010

DESIGN APPROVED BY:

For Commander, NAVFAC MID-ATLANTIC:
Date: 8.12.10

DESIGN/BUILD RFP

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SECTION 01 14 00.05 20

WORK RESTRICTIONS FOR DESIGN-BUILD
11/07

PART 1 GENERAL

1.1 SUBMITTALS

The use of a "G" following a submittal indicates that a Government approval action is required. Submit the following in accordance with Section 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES and Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES.

SD-01 Preconstruction Submittals

List of contact personnel; G

1.2 SPECIAL SCHEDULING REQUIREMENTS

a. The nearby buildings and utilities will remain in operation during the entire construction period. Conduct operations so as to cause the least possible interference with normal operations of the activity.

b. Permission to interrupt any Activity roads, railroads, and/or utility service shall be requested in writing a minimum of 15 calendar days prior to the desired date of interruption.

c. NMCI Contractor Access: The NMCI Contractor must be allowed access to the facility towards the end of construction (finishes 90% complete, rough-in 100% complete, Inside Plant (ISP)/Outside Plant (OSP) infrastructure in place) to provide equipment in the telecommunications rooms and make final connections. The Contractor will be required to coordinate their efforts with the NMCI contractor to facilitate joint use of building spaces during the final phases of construction and work the coordination effort into the construction schedule. Requirements for NMCI are specified in Part 4, D50 ELECTRICAL and G40 SITE ELECTRICAL UTILITIES.

1.3 CONTRACTOR ACCESS AND USE OF PREMISES

1.3.1 Activity Regulations

Ensure that Contractor personnel employed on the Activity become familiar with and obey Activity regulations. Keep within the limits of the work and avenues of ingress and egress. Wear hard hats in designated areas. Do not enter any restricted areas unless required to do so and until cleared for such entry. The Contractor's equipment shall be conspicuously marked for identification.

1.3.1.1 Subcontractors and Personnel Contacts

Furnish a list of contact personnel of the Contractor and subcontractors including addresses and telephone numbers for use in the event of an emergency. As changes occur and additional information becomes available, correct and change the information contained in previous lists.

1.3.1.2 Identification Badges

Identification badges, if required, will be furnished without charge. Application for and use of badges will be as directed. Furnish a completed EMPLOYMENT ELIGIBILITY VERIFICATION form (DHS FORM I-9) for all personnel requesting badges. This form is available at http://uscis.gov/graphics/formsfee/forms/files/i-9.pdf. Immediately report instances of lost or stolen badges to the Contracting Officer.

1.3.2 Working Hours

Regular working hours shall consist of an 8 1/2 hour period established by the Contracting Officer, Monday through Friday, excluding Government holidays.

1.3.3 Work Outside Regular Hours

Work outside regular working hours requires Contracting Officer approval. Make application 15 calendar days prior to such work to allow arrangements to be made by the Government. During periods of darkness, the different parts of the work shall be lighted in a manner approved by the Contracting Officer.

1.3.4 Occupied Building

The Contractor shall be working around existing buildings which are occupied. Do not enter the buildings without prior approval of the Contracting Officer.

1.3.5 Utility Cutovers and Interruptions

a. Make utility cutovers and interruptions after normal working hours or on Saturdays, Sundays, and Government holidays. Conform to procedures required in the paragraph "Work Outside Regular Hours."

b. Ensure that new utility lines are complete, except for the connection, before interrupting existing service.

c. Interruption to water, sanitary sewer, storm sewer, telephone service, electric service, air conditioning, heating, fire alarm, and compressed air shall be considered utility cutovers pursuant to the paragraph entitled "Work Outside Regular Hours."

d. Operation of Station Utilities: The Contractor shall not operate nor disturb the setting of control devices in the station utilities system, including water, sewer, electrical, and steam services. The Government will operate the control devices as required for normal conduct of the work. The Contractor shall notify the Contracting Officer giving reasonable advance notice when such operation is required.

1.3.5.1 Location of Underground Utilities

Obtain digging permits prior to start of excavation. Scan the construction site with electromagnetic or sonic equipment, and mark the surface of the ground or paved surface where existing underground utilities or utilities encased in pier structures are discovered. Verify the elevations of existing piping, utilities, and any type of underground or encased

obstruction not indicated to be specified or removed but indicated or discovered during scanning in locations to be traversed by piping, ducts, and other work to be conducted or installed.

a. Notification Prior to Excavation: Notify the Contracting Officer at least 15 days prior to starting excavation work.

1.4 SECURITY REQUIREMENTS

Contract Clause "FAR 52.204-2, Security Requirements and Alternate II," "FAC 5252.236-9301, Special Working Conditions and Entry to Work Area," and the following apply:

1.4.1 Business Access Security Requirements, Camp Lejeune, NC

1.4.1.1 Business Access Definition

Contractor/subcontractor employees requiring installation access to MCB, Camp Lejeune or MCAS New River, N.C. must obtain a Business Access Identification Badge for that particular installation. Regularly scheduled delivery personnel, to include FEDEX, UPS, pick-up and deliveries, should also follow the Business Access guidelines described below. Personnel requiring Business Access Identification Badges shall submit all documentation listed below. Badges are not required if the contracted position requires the employee to obtain a Common Access Card (CAC) which will be identified separately within the Government contract.

1.4.1.2 Installation Security Access Requirements

Contractor shall accomplish the security requirements below within 10 days after award or prior to performance under the contract.

1.4.1.3 Business Access Identification Badge Requirement

In order to obtain a Business Access Identification Badge for access to MCB, Camp Lejeune, and satellite activities, or MCAS New River, NC, all personnel providing services under this contract shall be required to present the documentation below to the following offices, as applicable:

a. MCB, Camp Lejeune, NC and its satellite activities. Report as follows:

1. Identification Card Center, 59 Molly Pitcher Road for badge (910-451-2727).

b. MCAS New River, NC. Report as follows:

1. S-4 (Facilities Office), Bldg AS-211 (1st Deck) for registration on contractor's list (910-449-6310).

2. Pass and Identification Office, Bldg AS-211 (1st Deck) for badge and vehicle decal (910-449-5427/5428).

1.4.1.4 Documentation

a. Photo ID:

Valid state or federal issued picture identification card. Acceptable documents include state drivers license, DMV issued photo identification, or alien registration card.

b. Proof of Employee Citizenship or Legal Alien Status:

Acceptable documents include birth certificate, Social Security Cards, Immigration and Naturalization Service (INS) forms and passports.

c. Proof of Criminal Records Check:

Proof of a criminal records check from the county or state where the employee has resided for the previous two years (or length of legal residence for foreign nationals in the U.S. for less than two years). Criminal background records checks must be from a credible source. Many credible sources exist, but some examples include the County Courthouse, Infolink Screening Services, Inc. (www.infolinkscreening.com), IntegraScan Criminal Records Checks (www.integrascan.com), Intelius Employee Screening (www.Intelius.com), and Castle Branch www.castlebranch.com). Subsequent to the initial criminal background records checks, local criminal records checks shall be conducted annually prior to renewal of badges for reevaluation.

d. Letter Provided By Contracting Officer Indicating Contract:

Letter provided by Contracting Officer indicating contract, contract period and prime contractor. Proof of employment on a valid Government contract (e.g., a letter on company letterhead from the prime contractor including contract number and term).

1.4.1.5 Denial of Access

Installation access shall be denied if it is determined that an employee:

a. Is on the National Terrorist Watch List

b. Is illegally present in the United States.

c. Is subject to an outstanding warrant.

d. Has knowingly submitted an employment questionnaire with false or fraudulent information.

e. Has been issued a debarment order and is currently banned from military installations.

f. Is a Registered Sexual Offender, or has any Felony Conviction within the past two years.

1.4.1.6 Appeal Process

All appeals should be directed to the Base Inspector's Office for any individual that has been denied access to the Base.

1.4.1.7 Display and Disposition of Badges

Contractors/subcontractors shall prominently display their badges on their person at all times. Upon completion/termination of this contract or an individual's employment, the Contractor shall collect and turn in to the Pass & ID Office all badges. If the Contactor fails to obtain the

employee's badge, the Pass & ID Office shall be notified within 24 hours. During the contract performance period contractors will immediately report instances of lost or stolen badges to the issuing pass and identification office.

1.4.1.8 Contractor and Subcontractor Vehicle Requirements

Each vehicle to be used in contract performance shall show the Contractor's or subcontractor's name so that it is clearly visible and shall always display a valid state license plate and safety inspection sticker. To obtain a vehicle decal, which will be valid for one year or contract period, whichever is shorter, Contractor or subcontractor vehicle operators shall provide to the Vehicle Registration Office, 60 Molly Pitcher Road for vehicle decal (910-451-1158):

a. An installation sponsor request forwarded to provost Marshall office.

b. A valid form of Federal or state government I.D.

c. If driving a motor vehicle, a valid driver's license, vehicle registration and proof of insurance.

Upon completion/termination of this contract or an individual's employment, the Contractor shall collect and turn in to Vehicle Registration all Government vehicle decals. If any are not collected, the Contractor shall notify the Vehicle Registration Office within 24 hours.

1.4.1.9 Security Checks

Contractor personnel and vehicles shall only be present in locations relevant to contract performance. All Contractor personnel entering the base shall conform to all Government regulations and are subject to such checks as may be deemed necessary to ensure that violations do not occur. Employees shall not be permitted on base when such a check reveals that their presence would be detrimental to the security of the base. Subject to security regulations, the Government will allow access to an area for servicing equipment and/or performing required services. Upon request, the Contractor shall submit to the Contracting Officer questionnaires and other forms as may be required for security purposes.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

SECTION 01 20 00.05 20

PRICE AND PAYMENT PROCEDURES FOR DESIGN-BUILD
04/10

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. ARMY CORPS OF ENGINEERS (USACE)

EP-1110-1-8 (2005) Construction Equipment Ownership and Operating Expense Schedule, Vol 1-12

1.2 SUBMITTALS

The use of a "G" following a submittal indicates that a Government approval action is required. Submit the following in accordance with Section 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES and Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES.

SD-01 Preconstruction Submittals

Schedule of prices; G

1.3 SCHEDULE OF PRICES

1.3.1 Schedule Instructions

Payments will not be made until the Preliminary Schedule of Prices or Cost Loaded Critical Path Method (CPM) schedule has been submitted to and accepted by the Contracting Officer. The Schedule of Prices shall be separated as follows:

a. Primary Facility/s Cost Breakdown: Defined as work on the primary facility/s out to the 1.5 m (5 foot) line. Work out to the 1.5 m (5 foot) line shall include construction encompassed within a theoretical line 1.5 m (5 foot) from the face of exterior walls and shall include attendant construction, such as pad mounted HVAC equipment, that may extend beyond the 1.5 m (5 foot) line.

b. Supporting Facilities Cost Breakdown: Defined as site work, including incidental work, outside the 1.5 m (5 foot) line.

1.3.1.1 Additional Facility Price Data

For the purposes of historical pricing data collection for Government use only, simultaneously submit this data to the NAVFAC Chief Cost Engineer at the following mailing or email address within 30 days of contract award:

a. Commander
Naval Facilities Engineering Command Atlantic
6505 Hampton Blvd.
Norfolk, VA 23508-1278

Attention: CI Cost

b. FacilityCostData@navy.mil

This information is for Government internal purposes only for tracking historical primary and support facility pricing and will not be used for any scope, price, or evaluation purposes.

1.3.2 Schedule Requirements for HVAC TAB

The field work required by PTS Section D30, HVAC, shall be broken down in the NAS by separate line items which reflect measurable deliverables. Specific payment percentages for each line item shall be determined on a case by case basis for each contract. The line items shall be as follows:

a. Approval of Design Review Report.

b. Approval of the pre-field engineering report.

c. Season I field work.

d. Approval of Season I report.

e. Completion of Season I field QA check.

f. Approval of Season II report.

1.3.3 Data Required

This contract requires the use of a cost-loaded Network Analysis Schedule. The information required for the Schedule of Prices will be entered as an intregal part of the Network Analysis Schedule (NAS) and its Mathematical Analysis. Provide a detailed breakdown of the contract price, giving quantities for each of the various kinds of work, unit prices, and extended prices therefore. Costs shall be summarized and totals provided for each construction category.

1.3.4 Real Property Assets

Provide real property asset records to cover the facility assets created by this contract. These assets records must be broken out by construction categories as listed below. Coordinate the particular construction categories identified for the project and the development of the assets records with the Contracting Officer and the Real Property Accounting Officer.

The following construction categories apply to work covered by this specification.

CATEGORY	DESCRIPTION
13510	COMMUNICATION-LINES-OTHER THAN TELEPHONE
13520	TELEPHONE LINES
72210	ENLISTED DINING FACILITY
75022	GREENWAY TRAIL
75057	CONCRETE OUTDOOR DINING AREA

CATEGORY	DESCRIPTION
81160	STAND-BY GENERATOR PLANT (EXCLUDE NO-BREAK UNITS)
81220	STREET LIGHTING
81231	OVERHEAD ELECTRICAL DISTRIBUTION LINES
81232	UNDERGROUND ELECTRICAL DISTRIBUTION LINES
81240	AREA LIGHTING
82222	UNDERGROUND STEAM DISTRIBUTION LINE
82224	UNDERGROUND STEAM CONDENSATE LINE
82410	NATURAL GAS LINE
83116	OIL/WATER/GRIT SERARATOR CHAMBER
83210	SANITARY SEWER BASE
83210	SANITARY SEWER SITE
83230	PUMP LIFT STATION
83330	DUMPSTER PADS AND SCREEN WALL
84120	WATER DISTRIBUTION SUPPLY MAINS POTABLE
84210	WATER DISTRIBUTION LINE POTABLE
84310	FIRE PROTECTION WATER LINE
84450	STORM WATER POND
84472	FIRE PUMP W/DIESEL BACKUP
85110	ROADS/CONCRETE
85110	ROADS/BIT
85110	ROADS/INTERSECTION IMPROV W/TRAFFIC LIGHT
85210	PARKING AREA/CONCRETE
85210	PARKING AREA/BIT
85220	SIDEWALK AND WALKWAYS, PAVED
85221	SIDEWALK AND WALKWAYS, UNPAVED
85235	GENERATOR PAD
87110	STORM SEWER
87120	DRAINAGE DITCH
88010	FIRE-ALARM SYSTEM

Contractor shall determine all additional applicable Construction Categories from the "Category Codes for Military Real Property", which is available from the Contracting Officer. Divide detailed asset breakdown into each construction category, sufficient for completion of the DD Form 1354, Transfer and Acceptance of Military Real Property. The DD Form 1354 requirement for tabulating costs for each facility number may require additional cost breakdowns in some categories. Coordinate with subcontractors who may be involved in work under more than one of these categories to divide their work into each applicable construction category. Construction categories given above may be modified by the Contracting Officer as necessary during course of work. Changes in the construction categories may require the Contractor to modify his asset records.

Cost data accumulated under this section is required in the preparation of DD Form 1354. Coordinate with Section 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES paragraph "DD Form 1354".

1.4 CONTRACT MODIFICATIONS

In conjunction with the Contract Clause "DFARS 252.236-7000, Modification Proposals-Price Breakdown," and where actual ownership and operating costs of construction equipment cannot be determined from Contractor accounting

records, equipment use rates shall be based upon the applicable provisions of the EP-1110-1-8.

1.5 CONTRACTOR'S INVOICE AND CONTRACT PERFORMANCE STATEMENT

1.5.1 Content of Invoice

Requests for payment will be processed in accordance with the Contract Clause "FAR 52.232-27, Prompt Payment Construction Contracts," and shall include items required by FAR 52.232-5, "Payments under Fixed-Price Construction Contracts" and shall be accompanied with the following documents. If NFAS Clause 5252.232-9301 is present in the contract, documents shall be provided as attachments in Wide Area Work Flow (WAWF). The maximum size limit per attachment is less than 2 megabyte but you may have an unlimited amount of attachments. If a document cannot be attached in WAWF due to system or size restriction it shall be provided as instructed by the Contracting Officer.

a. The Contractor's invoice on Form 7300/30 furnished by the Government for this purpose, showing in summary form, the basis for arriving at the amount of the invoice. Invoice Form shall be certified by the QC and provide the number of copies required by the Contracting Officer.

b. The Contract Performance Statement on the form furnished by the Government for this purpose, showing in detail, the estimated cost, percentage of completion, and value of completed performance for each of the construction categories stated in this contract. Submit number of copies required by the Contracting Officer.

c. Final invoice shall be accompanied by Final Release Form, NAVFAC Form 4330/07, furnished by the Government. If the contractor is incorporated, the release shall contain the corporate seal. An officer of the corporation shall sign the release and the corporate secretary shall certify the release.

d. Updated schedule if not already submitted per Section 01 32 17.05 20 NETWORK ANALYSIS SCHEDULES (NAS) FOR DESIGN-BUILD.

e. Contractor Safety Self Evaluation Checklist (original).

f. Monthly Work-hour Report.

g. Solid Waste Disposal Report.

h. Other supporting documents as requested.

1.5.2 Submission of Invoices

a. All invoices shall be submitted electronically via WAWF if NFAS Clause 5252.232-9301 is present in the contract otherwise it shall be submitted in accordance with contract invoicing instructions. All other paper invoices shall be forwarded with specific marking on the envelope. This marking shall be in the front lower left hand corner, in large letters, "INVOICES - ENCLOSED."

b. Invoices not completed in accordance with contract requirements will be returned to the Contractor for correction of the deficiencies.

c. Final invoices not accompanied by Final Release Form will be considered

incomplete and will be returned to the Contractor. For final invoices being submitted via WAWF, the original Contractor's Final Release form must be provided to the respective Contracting Officer prior to submission of the final invoice. Once receipt of the original final release form has been confirmed by the Contracting Officer, Contractor shall then submit final invoice and attach copy of the final release form in WAWF.

1.6 PAYMENTS TO THE CONTRACTOR

Payments will be made on submission of itemized requests by the Contractor which comply with the requirements of this section, and will be subject to reduction for overpayments or increase for underpayments made on previous payments to the Contractor.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

SECTION 01 30 00.05 20

ADMINISTRATIVE REQUIREMENTS FOR DESIGN-BUILD
11/07

PART 1 GENERAL

1.1 MINIMUM INSURANCE REQUIREMENTS

Procure and maintain during the entire period of performance under this contract the following minimum insurance coverage:

a. Comprehensive general liability: $500,000 per occurrence

b. Automobile liability: $200,000 per person, $500,000 per occurrence for bodily injury, $20,000 per occurrence for property damage

c. Workmen's compensation as required by Federal and State workers' compensation and occupational disease laws.

d. Employer's liability coverage of $100,000, except in States where workers compensation may not be written by private carriers,

e. Others as required by the State.

1.2 CONTRACTOR PERSONNEL REQUIREMENTS

1.2.1 Subcontractor Special Requirements

1.2.1.1 Asbestos Containing Material

All contract requirements of PART 4, F20 SELECTIVE DEMOLITION,assigned to the Private Qualified Person (PQP) shall be accomplished directly by a first tier subcontractor.

1.2.1.2 HVAC TAB

All contract requirements of TAB work required by PART 4, D30, HVAC, shall be accomplished directly by a first tier subcontractor. No TAB work required by PART 4, D30, HVAC, shall be accomplished by a second tier subcontractor.

1.2.1.3 Qualified Testing Organization

All contract requirements of work required to be performed by a Qualified Testing Organization in PART 4, D50 ELECTRICAL and G40 SITE ELECTRICAL UTILITIES, shall be accomplished directly by a first tier subcontractor. No work to be performed by a Qualified Testing Organization, required by PART 4, D50 and G40 shall be accomplished by a second tier subcontractor.

1.3 SUPERVISION

Have at least one qualified supervisor capable of reading, writing, and conversing fluently in the English language on the job site during working hours. In addition, the Quality Control (QC) representative shall also have fluent English communication skills.

1.4 CLEANUP

Leave premises "broom clean." Clean interior and exterior glass surfaces exposed to view; remove temporary labels, stains and foreign substances; polish transparent and glossy surfaces; vacuum carpeted and soft surfaces. Clean equipment and fixtures to a sanitary condition. Replace filters of operating equipment. Clean debris from roofs, gutters, downspouts and drainage systems. Sweep paved areas and rake clean landscaped areas. Remove waste and surplus materials, rubbish and construction facilities from the site.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

SECTION 01 31 19.05 20

POST AWARD MEETINGS
04/10

PART 1 GENERAL

1.1 SUMMARY

This document includes post-award requirements for project kickoff and subsequent design and preconstruction meetings.

1.2 SUBMITTALS

The use of a "G" following a submittal indicates that a Government approval action is required. Submit the following in accordance with Section 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES.

SD-01 Preconstruction Submittals

Project Schedule; G

Performance Assessment Plan (PAP); G

CDW Facilitator Experience Resume; G

CDW Preliminary Concept Design; G

CDW Basis of Design with Cost Estimate; G

CDW Concept Design Report; G

1.3 POST AWARD KICKOFF MEETING

The Post Award Kickoff (PAK) meeting is made up of Contract Administration, and Scheduling. If mutually beneficial to the Contractor and the Government, these elements may be addressed in a single meeting or multiple meetings.

1.3.1 PAK Meeting Schedule and Location

Within 21 calendar days after contract award, and prior to commencing work, meet with the Contracting Officer for the PAK meeting(s). The meeting shall be held at a specific time and place to be determined by the Contracting Officer.

1.3.2 PAK Meeting Outcomes

The meeting(s) outcomes are:

a. Integrate the Contractor and all client representatives into the project team.

b. Achieve consensus from the project team on any issues and concerns with the Contractor's technical proposal. The User(s) will make a presentation of their functional requirements. **Achieve consensus that User's functional requirements are understood and will be implemented into the project design.**

c. Establish and explain policies and procedures for completion of a successful project.

d. Establish clear lines of communication and points of contact for Government and Contractor team members.

e. Establish clear expectations for the Concept Design Workshop.

f. Establish project design schedule, design submittal packaging, and preliminary construction schedule in accordance with Section 01 32 17.05 20 NETWORK ANALYSIS SCHEDULES (NAS) FOR DESIGN-BUILD. Discuss design milestones and events that need to be included in the Quality Control Communication Plan.

g. Establish procedure for design packages reviews, Contractor's resolution to comments, and Government's role in review of packages.

h. Establish clear expectations for facility turnover and providing DD Form 1354 asset management records to the Government.

1.3.3 PAK Meeting Contractor Attendees

The following Contractor key personnel shall attend the PAK meeting: Project Manager, Project Scheduler, Designer of Record (DOR) Representative(s), Superintendent, QC Manager, and DQC Manager. Optional attendees include: Principal, Assistant Project Manager, Design Staff representing each architectural/engineering discipline, major subcontractors and specialized supplemental QC personnel.

1.3.4 Contract Administration

Contract administration roles and responsibilities will be addressed.

1.4 PARTNERING MEETING

LEVEL A PARTNERING: To most effectively accomplish this contract, the Government requires the formation of a cohesive partnership with the Contractor. Key personnel representing Base Facilities, the Designer of Record (DOR), principal individuals from NAVFAC MIDLANT and from the Resident Officer in Charge of Construction (ROICC) office, the project sponsor, and representative(s) of the facility user will be invited to participate in the partnering process. Key members of the Contractor and subcontractor teams, including senior management, must participate.

The partnership will draw on the strength of each organization in an effort to achieve a quality project done right the first time, within budget, on schedule, and without any safety mishaps.

The Contractor shall pay all costs associated with the partnering effort including meeting room and other incidental items. The participants shall bear their own costs for meals, lodging and transportation associated with partnering.

Before the partnering session, the Contractor shall coordinate with the facilitator requirements for incidental items (audio-visual equipment, two easels, flipchart paper, colored markers, note paper, pens/pencils, colored flash cards, etc.) and have these items available at the partnering session. The Contractor will copy documents for distribution to all

attendees.

1.4.1 Initial Partnering Session

a. Will last one day minimum.

b. Will include participants as listed under paragraph "PAK Meeting Attendees".

c. Should be held at a location off base as agreed to by the partners.

d. The Contractor shall provide a Facilitator who is experienced in conducting Partnering Workshops. The Partnering Facilitator shall be acceptable to the Contracting Officer. He or she will be responsible for leading the team in a timely manner and making sure that issues are pursued and resolved to the maximum extent possible.

e. May take place with the PAK meeting.

1.4.2 Follow-on Partnering Session(s)

a. Shall be held quarterly or as agreed to by the partners.

b. May be held concurrently with other scheduled meetings such as QC or scheduling.

c. May be held at a location off base, the project site, or in government facilities on base.

d. May include only participants required to resolve current issues.

e. Will generally last a half day or less and may utilize electronic means if mutually acceptable to all parties.

f. Will not require a facilitator unless desired by the partners.

1.5 CONCEPT DESIGN WORKSHOP (CDW)

Provide a Concept Design Workshop (CDW) for this project. This effort will examine project functions and requirements, quality and life safety costs, analyze alternate design concepts, expose and resolve project issues, and develop the final conceptual design. The outcome of the CDW shall be an acceptable conceptual design including floor and site plans, signed by the client, Contractor and other key team members.

1.5.1 CDW Meeting Attendees

The following Contractor key personnel shall attend the CDW: Project Manager, Project Scheduler, Cost Estimator, Design Staff representing each architectural/engineering discipline, Superintendent, QC Manager, and DQC Manager. Optional attendees include: Principal, Assistant Project Manager, major subcontractors and specialized supplemental QC personnel.

1.5.2 General

1.5.2.1 Facilitator

The Contractor will provide a Facilitator who is experienced in conducting Concept Design Workshops. Provide CDW Facilitator Experience Resume for

approval prior to the CDW. The CDW Facilitator must be acceptable to the Contracting Officer. He or she will be responsible for leading the team in a timely manner, making sure that issues are pursued and resolved to the maximum extent possible, documenting meetings, organizing the design concept documents for on-site approval, and providing the CDW Concept Design Report.

1.5.2.2 Contractor's Design Team

The primary functions of the Design Team will be to investigate, develop and present alternate design solutions. The entire Design Team will participate in all phases of the Concept Design Workshop effort and provide assistance to the Facilitator in development of the Concept Design Workshop Report, including most of the required documentation.

1.5.2.3 Award Amount

With each alternate design solution the Contractor shall verify that the concept is within the contract award amount.

1.5.2.4 CDW Concept Design Report

The CDW Concept Design Report will summarize the final conceptual design and will be produced almost entirely on-site during the workshop.

1.5.3 Procedure

1.5.3.1 Preliminary Work

The Contractor's Design Team shall complete the following prior to the on-site workshop:

a. Review the contract documents and references explaining the project scope and history.

b. Make arrangements for and provide an appropriate conference room convenient to the project site and/or Users for use by the Design Team and Government participants during the workshop.

c. Four weeks following the Post Award Kickoff meeting, prepare 20 copies of a CDW Preliminary Concept Design (Concept #1), a Basis of Design, and a statement that the concept provided is within the award amount for distribution at the Concept Design Workshop.

d. Facilitator shall conduct meeting with NAVFAC representatives before the Concept Design Workshop to review preparations, relationships, and the status of work to be accomplished. Meeting may be conducted via telephone or other electronic means if mutually agreeable to all concerned.

e. Resolve any outstanding issues regarding the CDW with the Contracting Officer.

1.5.3.2 On-Site Workshop

The on-site workshop shall last a minimum of three working days, minimizing breaks so as to maintain momentum. The Design Team should expect longer than normal workdays and shall accomplish the following items during the on-site phase of the Concept Design Workshop.

a. The Facilitator will describe the Concept Design Workshop process and review the workshop agenda. The user(s) will provide a functional presentation to reiterate to all participants the User(s) needs and desires. The intent is to make the design solution and issue resolution function-oriented.

b. Present **CDW Preliminary Concept Design Concept #1** and respond to questions.

c. Participate in a comment/creative session to generate ideas to improve this project in the areas of function, quality and total life cycle cost, issue resolution and sustainable design within the award amount. It is often helpful to request User comments in writing so they may be considered, responded to, and presented at subsequent presentations.

d. Create a revised concept design. Design concepts shall include drawings, sketches, and other graphics as necessary to fully describe the concept. Prepare at least 20 copies for distribution at all presentations.

e. Repeat applicable steps as necessary. Usually two to three concepts are required. The final concept must be within the contract award amount.

f. The final concept shall include the following:

1. Site Plan: Show the layout of the proposed facility in relation to major landmarks. Show all buildings, access roads, parking, pedestrian walkways, roads, sidewalks, landscaping, and major utilities. Indicate major dimensions and orientation. Provide an analysis relating the proposed building site, size, and construction type to applicable codes and criteria.

2. Building Floor Plans: Provide floor plans depicting functional utilization of spaces and furniture and equipment layout. Show room dimensions. Provide a Life Safety Code® analysis with the floor plan to identify required life safety and egress features.

3. Perspective Sketches: Provide at least one sketch to show a perspective of major buildings. The sketch should not be elaborate but must show the proposed form and massing, colors to be used, and an indication of materials used.

4. Mechanical Plans: Provide plans as necessary to show the essential work and intent of the design. Suggestions include equipment layouts, zones, etc.

5. Electrical Plans: Provide plans as necessary to show the essential work and intent of the design. Suggestions include special light fixture types, locations, switching, power outlets and panelboard location. Provide electrical distribution single line diagram.

6. CDW Basis of Design with Cost Estimate: Describe, in layman's terms, the intent of the design by discipline. Address material quality, energy efficiency and life cycle costs. Provide a statement that the concept presented can be constructed within the award amount.

7. Sustainable Design: Demonstrate ability to achieve the required LEED certification.

8. System Safety Engineering

g. Prepare 20 copies of the final concept (drawings, basis of design and statement that the concept is within the award amount) for distribution at the final presentation.

h. Dependent upon the project, the Concept Design Workshop Report is provided by the Facilitator, includes all items included in the final concept design and the following:

1. Endorsements: Include a copy of the signature/endorsement sheet.

2. Comments: Include comments and resolutions concerning the final concept design.

3. Executive Summary: Summarize the workshop, including how the various concepts differed and were improved during the workshop.

4. Special Design Features: Identify and describe unique project needs and features, e.g., pile foundations, physical security, intrusion detection systems, access control, construction in humid climates, pollution abatement, etc.

5. Architectural Compatibility Statement: Identify architectural style, materials, and color scheme; and indicate their compatibility with installation planning and design concepts established in the Base Exterior Architectural Plan.

6. Environmental Summary: Provide a summary of environmental issues, listing completed actions and items requiring further coordination, waivers or permits.

7. Supporting Project Documentation: Include data to support the development of the concept design, layout, and special features. Items should include: project scope discussion, minutes of meetings, function analysis work sheets, and economic and technical analyses of alternatives evaluated.

i. Except for final comments, responses and endorsements, the final report should be completed (electronically) on site, before the final presentation. If requested by the Government Project Manager, be prepared to present up to 10 hard copies of the report at the conclusion of the workshop.

j. Conduct a "front-to-back" comprehensive presentation of the final concept. Obtain user signatures on a conceptual design endorsement sheet, signifying approval of the concept design, subject to the final comments and their resolutions agreed to at the final presentation meeting.

1.5.3.3 Concept Design Workshop Report

Within 14 calendar days after completion of the on-site Concept Design Workshop, the Design Team shall submit to the Government Project Manager an electronic copy of the Concept Design Workshop Report as one file in *.PDF format.

1.6 PERFORMANCE ASSESSMENT PLAN (PAP)

The Performance Assessment Plan (PAP) shall be used to document design innovation and budget management, provide performance feedback to the Contractor, and as a basis for interim and final evaluations in the Construction Contractor Appraisal System (CCASS) on-line database.

It is the intent of the Government to establish the PAP based on tangible, measurable indicators of outstanding contractor performance, and on commitments made in the Contractor's proposal. The initial PAP may be found on the NAVFAC Design-Build Request for Proposal Website in RFP PART 6 Attachments. Review and finalize the initial PAP during the Partnering Session. During the initial Partnering Session, the Government, the Contractor, the Designer-of-Record, and the Client will establish the PAP. Following the establishment of the PAP, the Contractor will present it, with his input, for update and discussion at project meetings which discuss project performance. Submit an updated PAP on a monthly basis with the invoice for that period as a minimum. A copy of the initial PAP is attached.

1.7 PROJECT SCHEDULE

Provide in accordance with Section 01 32 17.05 20 NETWORK ANALYSIS SCHEDULES (NAS) FOR DESIGN-BUILD.

1.8 DESIGN QUALITY ASSURANCE MEETINGS

After Government Quality Assurance (QA) of each Design Submittal has been completed, meet with the Government to discuss review comments for the specific design submittal.

Provide consolidated copies of all Government comments with annotations of Contractor's action beside them. Notify the Contracting Officer in writing within five (5) days after receipt of Government's comments if the Contractor disagrees with comments technically or interprets comments to exceed the requirements of the contract.

1.8.1 Design QA Meeting Attendees

The following Contractor key personnel shall attend the design QA meetings: Project Manager, QC Manager, DQC Manager, and Contractor's Design Staff (architect and engineering disciplines related to topics to be discussed).

1.8.2 Design QA Meeting Location

Meetings shall be located at the office of the Contracting Officer's QA Team or may be conducted at other locations or by electronic means if mutually acceptable to all parties.

1.8.3 Minimum Design QA Meeting Agenda

Address all Government comments that are unresolved and present clarification or supporting information requested by the Contracting Officer's QA team during the previous meeting.

1.9 PRECONSTRUCTION MEETING

Meet with the Contracting Officer to discuss construction items of concern

to the Government and the Contractor such as outages, storage, trailer location, disposal of construction debris, safety, etc. at a location to be determined by the Contracting Officer. The Preconstruction meeting may take place with the PAK meeting or at any time prior to mobilization and before any construction work begins.

1.10 RECURRING MEETINGS

1.10.1 Quality Control and Production Meetings

Provide Quality Control and Production Meetings in accordance with UFGS Section 01 45 00.05 20 DESIGN AND CONSTRUCTION QUALITY CONTROL.

1.10.2 Safety Meetings

Provide Safety Meetings in accordance with UFGS Section 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS.

1.11 FACILITY TURNOVER PLANNING MEETINGS

Key personnel will meet to identify strategies to ensure the project is carried to expeditious closure and turnover to the Client. Start the turnover process at the PAK Meeting and convene the Facility Turnover Meetings once the project has reached approximately 75% completion or three to six months prior to Projected Completion Date or Contract Completion Date (CCD), whichever comes first. The Contracting Officer's Representative will lead the meetings and guide the discussions based on an agenda provided by the Government. See attached "Facility Turnover Planning Meeting Agenda" for typical meeting agenda. The Facility Turnover effort shall include the following:

a. PAK Meeting

1. Contracting Officer's Technical Representative (COTR) will provide the Facility Turnover Checklist and the Contractor, Client, and NAVFAC Representatives will compare Contractor's schedule to Facility Turnover Checklist to ensure all Contractor Checklist Items are included in the schedule and to discuss the scheduling impact of Client and NAVFAC Checklist Items.

2. Discuss the requirements of creating the Interim and Final DD Form 1354 to provide asset management records to the Government. Refer to Section 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES for requirements.

b. Facility Turnover Meetings -

1. Fill in the Facility Turnover Checklist including Contractor, Client, and NAVFAC Checklist Items and assign a person to be responsible for each item and a due date. The Contracting Officer's Representative will facilitate the assignment of responsibilities and fill out the Facility Turnover Checklist. See attached Facility Turnover Checklist.

2. Review the Contractor's updated schedule. The Contractor and the Contracting Officer's Representative shall develop a POAM for the completion of all Contractor, Client, and NAVFAC Checklist items.

3. Confirm that all Facility Turnover Checklist items will be

completed on time for the scheduled Facility Turnover.

1.11.1 Facility Turnover Meeting Attendees

The following key personnel shall attend the Facility Turnover Meetings: Contractor QC Manager, Design Quality Control Manager, Superintendent, Major Subcontractors, Designer-of-Record, Contracting Officer's Representative, Representative(s) of NAVFAC, the Facility Owner / Real Property Accounting Officer, and the Client.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

-- End of Section --

NAVFAC Red Zone
Facility Turnover Planning Meeting

AGENDA

I. Introduction and Overview – Purpose CM

The purpose of the Facility Turnover Planning Meeting is to address elements within the project team's purview – schedule management, assure completed facility complies with contract requirements, and other contractual issues. Each member of the project delivery team (Client, NAVFAC, and the contractor) has critical responsibilities to ensure timely completion and turnover of the new facility and each member should execute the NRZ process to achieve this end. The NRZ process provides a final re-focusing of attention to details of those key elements critical for a successful construction contract completion. In implementing NRZ processes, the NAVFAC/Contractor/Client team take a collective "snapshot" of contract status, identifying remaining actions to be accomplished, and confirm required resources needed for successful contract completion and turnover to the Client.

The Facility Turnover Planning Meeting is a collaborative effort between the Client, NAVFAC, and the contractor and results in a completed "NRZ Checklist/POAM Items" list that identifies the major items (and their due dates) that must be completed by the Contractor, the Client and the NAVFAC team to ensure timely completion of the contract.

II. Attendees

NAVFAC Echelon IV (PM); NAVFAC FEAD/ROICC Team (AROICC, CM, ET/QA, Contracting Officer); Client Team (Project Manager, Program Coordinator, User/Tenant); Contractor Team (Project Manager, Project Superintendent, CQC Manager)

III. Schedule to Completion (POAM)	Contractor
IV. Schedule of Final Outfitting and Occupancy (POAM)	Client
V. Critical feature(s) of project (POAM)	CM
VI. Transfer of Maintenance Responsibility	CM
VII. Systems training & O&M Manuals (POAM)	CQC Manager
VIII. Other Items to include on NRZ checklists	All
IX. Summary of Required Actions and Responsibility	CM

Guidelines for conducting Facility Turnover Planning Meeting are as follows:

a. Meeting is held at approximately 75% construction contract completion or three to six months prior to BOD. NAVFAC representatives will include the Project Manager, Construction Manager/AROICC (CM) and Design Manager (DM), as appropriate. The contractor representatives include applicable prime contractor staff and decision-makers from major subcontractors. Design-Build contractors will have A-E representatives attending. The Client should include representatives from Public Works Officer (PWO) staff, a Client scope and financial decision maker, a user tenant representative, a facility start-up person, and others such as SPAWAR, NMCI, telephone, and furniture contractor, etc.

b. The purpose of the meeting is to plan the remaining work, identify critical project features that still need to be completed (such as "soft" construction contract requirements as shown on the NRZ Checklist/POAM Items), and to complete the filling out of the "NRZ Checklist/POAM Items".

c. The contractor, client and NAVFAC provide a POC and due date for each item on their checklist. The team fills in the checklists by selecting items applicable to the project, selects due dates on each item, and appoints a person who has responsibility to ensure the item gets completed by the due date. The CM will be responsible to monitor the milestones.

Facility Turnover Checklist Items

The tables below provide typical Facility Turnover Checklist Items for Contractor and Contracting Officer's Technical Representative (COTR) actions (Tables 1, 2, and 3, respectively). Items listed on the checklists are required to remain on the checklists if they are part of the project/contract or required by construction convention. Items not listed on the checklists, but required in the contract or by construction convention, must be added to the checklists by the Contractor and the COTR. Checklists are applicable to all contracts no matter what Category of Work.

The checklist items, points of contact and due dates shall initially be determined by the Contractor and the COTR during the Facility Turnover Planning Meeting. During execution of the Facility Turnover process, the checklist shall be updated as required to properly reflect project requirements. For each item on the entire list, the COTR, with input from the Contractor, shall indicate date completed and initial to indicate completion of the item. If a party fails to complete an item by the due date, this should be noted on the checklist and a new due date established and indicated. The completed Facility Turnover Checklist Items shall be placed in the contract file. The Contractor shall coordinate his items in Table 1 with the items in Tables 2 and 3.

Table 1

Contractor Checklist Items	Point of Contact	Due Date	Actual Complete Date	COTR Initials	Notes
a. Construction Completion Schedule					
b. Facility Delivery Closeout:					
Duct Air Leakage Testing					
HVAC System Test & Balance					
ACATS Controls Testing					
Conduct Second Seasons TAB					
Electrical Systems Testing					
Final utility systems connections (power, water, etc.)					
Superchlorination of potable water systems					
Plumbing / Other Mechanical Testing					
Elevator Certification(s)					
Specialized Equipment & Systems Inspections (Boilers, UPV, etc.)					
Fire Protection Systems Inspections and Performance Verification					
Communications / IT Systems Testing					
Security Systems Testing					
Other Specified Building Performance Requirements					
c. Other Contractor Items:					
Delivery of O&M Manuals					
Delivery of Equipment/Product Warranty List/Tag					
O&M/OMSI Training of Navy Personnel					
Site Restoration, if applicable					
Landscaping Complete					

Contractor Checklist Items	Point of Contact	Due Date	Actual Complete Date	COTR Initials	Notes
Pre-Final Inspection					
Final Inspection and Acceptance					
Delivery of Spare Parts, Extra Stock, Special Tools, etc					
Delivery of As-Built Drawings					
Delivery of Utility Record Drawings (if applicable)					
Delivery of Utility As-Built Drawings (if applicable)					
Beneficial Occupancy Date (BOD)					
Final Demobilization and Clean-up Completed					
Remove Construction Fence & Associated Coordination					
Pre-warranty Conference					
Project Close-out Meeting					
Coordination and Delivery of Facility Signage					
Final Cleaning					
Replace Construction Lock Cores and Re-keying					
Punch List Completion					
Provide DD1354 to Government CM					

Table 2

COTR Checklist Items for Coordination	Point of Contact	Due Date	Actual Complete Date	COTR Initials	Notes
Modification to FSC or BOSC to maintain/service new facility -Telephone service contract -Utilities service contract -Custodial service contract					
Installation of communications for phones and computers					
NMCI Installations or other networks					
Delivery and installation of furnished furniture					
Delivery and installation of furnished equipment					
User move-in					
GFE status/delivery schedule (GFCI, GFGI)					
Coordination of Intrusion Detection Systems and Physical Security Equipment					
Process operating permits					
Recycled/recovered materials report					
Coordination of IT and Communication Infrastructure and Devices (incl. CAT IV)					
Ribbon-cutting ceremony					

Table 3

COTR Checklist Items for Coordination with NAVFAC	Point of Contact	Due Date	Actual Complete Date	COTR Initials	Notes
Client walk-thru prior to pre-final inspections, if appropriate					
Schedule client satisfaction post BOD follow-up					
Schedule Government inspections of specialized equipment (e.g., Boiler/pressure vessels, elevators, UPS, SCIF shielding requirements, medical certifications, generators/switchgear)					
Provide keying plan to contractor					
Confirm utilities availability for final connections by contractor					
Startup utilities					
Mechanical Acceptance					
Resolve contract modifications & requests for equitable adjustment					
Contractor final release					
Return unobligated funds					
Process final payment					
Process recycled/recovered materials report					
Closeout actions on construction permits (e.g., NPDES)					
A-E and Construction Contractor Evaluations (ACASS/CCASS)					
Contractor QC Evaluation					
Complete Installed Property List and DD 1354					
Sign & provide Interim DD1354 to activity Real Property Accountability Officer NLT BOD					

Performance Assessment Plan
MONTHLY EVALUATION

MONTH: _____YEAR:_____

Evaluation Factor	Yes	No	N/A	Comments
Experience of Personnel 1. Did the team identified in the proposal actively participate in the project? 2. If personnel substitutions were needed, was the degree of technical competence maintained?				
Working Relationships 1. Did the Construction team participate in the design process (i.e. attend meetings, provide insight, etc.)? Were the coordination meetings between Construction and Design team personnel documented? 2. Did the Design team participate in the construction process (i.e. attend CQC meetings, perform field oversight, etc.)? Were coordination meetings between Construction and Design team personnel documented? 3. Did the collaboration between the Construction and Design Team deliver a high value innovative facility? - Were Total Operating Cost minimized - What LEED points can be obtained - Was energy efficiency optimized, and the energy goals exceeded. 4. Was the budget management process clear; was an estimate submitted on time with each design submittal. Was the estimate updated to reflect the changes in the design submittal? 5. Did the Contractor's team effectively manage the project budget and the User's requirements to meet the customer's needs? Was project budget and emphasis in cost control exhibited in the estimate? (Contractor to document in comments block				

materials/systems innovations and provision of higher quality than required in the RFP Part 4) *Additional factors to be developed during Partnering.*				
Quality Control 1. Were re-submittals of design deliverables or construction rework required this month? 2. Were as built redlines updated this month? *Additional factors to be developed during Partnering.*				
Timely Performance 1. Is the Contractor on schedule? 2. Is the Contractor maintaining the schedule? (Can the Government confirm the project is on schedule?) 3. Is the Contractor following his schedule? *Additional factors to be developed during Partnering.*				
Effectiveness of Management 1. Did the Government need to intercede in resolving a subcontractor issue? *Additional factors to be developed during Partnering.*				
Compliance with Labor Standards 1. Did payrolls have to be resubmitted this month due to inaccuracies or errors? *Additional factors to be developed during Partnering.*				
Compliance with Safety Standards 1. Were there any lost time accidents this month?				

Additional factors to be developed during Partnering.				

GENERAL PERFORMANCE COMMENTS THIS MONTH:

Concurrence:

CM/ROICC Representative _____Date_____.

Project Manager _____Date_____.

Contractor Representative _____Date_____.

SECTION 01 32 17.05 20

NETWORK ANALYSIS SCHEDULES (NAS) FOR DESIGN-BUILD
04/10

PART 1 GENERAL

1.1 DESCRIPTION

The Contractor is responsible for scheduling all design, procurement and construction. A single schedule shall logically incorporate all design and construction for the entire project. Unless otherwise indicated, the contractor may begin construction when design is signed, stamped and submitted to the Government via the Contractor's quality control organization.

Design activities shall include design decision points, design submittal packages, such as site and building, as well as design submittals, such as design development and final design. Review times for design development packages shall be included in the schedule. Refer to Section 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES for specific requirements.

If Government approval is required for any portion of a final signed and sealed design package prior to construction, that review time shall be included in the schedule. The schedule shall also include times for procurement, Contractor quality control and construction, acceptance testing and training. Refer to Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES to determine if any items require Government approval prior to construction; if any are required, that submittal review time shall be included in the schedule.

The schedule is a tool to manage the project, both for Contractor and Government activities. It will also be used to measure progress and to evaluate time extensions. If cost-loaded, it will provide the basis for progress payments.

The Contractor shall use the Critical Path Method (CPM) and the Precedence Diagram Method (PDM) to satisfy time and cost applications. For consistency, when scheduling software terminology is used in this specification, the terms in Primavera's scheduling programs are used.

1.2 SUBMITTALS

The use of a "G" following a submittal indicates that a Government approval action is required. Submit the following in accordance with Section 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES and Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES, except as modified in this contract.

SD-01 Preconstruction Submittals

Qualifications; G

Design Baseline Network Analysis Schedule (NAS); G

Construction Baseline Network Analysis Schedule (NAS); G

SD-07 Certificates

Monthly Network Analysis Schedule Updates; G

Three-Week Look Ahead Schedule; G

SD-11 Closeout Submittals

As-Built Schedule; G

1.3 SCHEDULE ACCEPTANCE PRIOR TO START OF WORK

Review comments made by the Government on the Contractor's schedule(s) will not relieve the Contractor from compliance with requirements of the Contract Documents. The Contractor is responsible for scheduling, sequencing, and prosecuting the Work to comply with the requirements of the Contract Documents.

The Design Baseline Network Analysis Schedule (NAS) shall be submitted and presented to the Government at the PAK Meeting. The acceptance of a Design Baseline NAS is a condition precedent to processing Contractor's pay request(s) for design activities/items of work.

Only bonds shall be paid prior to acceptance of the Design Baseline Network Analysis Schedule(NAS).

The most current updated design schedule shall accompany each design submittal.

The Contracting Officer and Contractor shall participate in a preliminary meeting(s) to discuss the proposed schedule and requirements of this section prior to the Contractor preparing the Construction Baseline Network Analysis Schedule (NAS).

The acceptance of a Construction Baseline NAS is a condition precedent to:

a. The Contractor starting work on the demolition or construction stage(s) of the contract.

b. Processing Contractor's pay request(s) for construction activities/items of work.

c. Review of any schedule updates

Submittal of the Baseline Network Analysis Schedules, and subsequent schedule updates, shall be understood to be the Contractor's certification that the submitted schedule meets all of the requirements of the Contract Documents, represents the Contractor's plan on how the work shall be accomplished, and accurately reflects the work that has been accomplished and how it was sequenced (as-built logic).

1.4 SOFTWARE

Use the scheduling software Primavera Project Planner (P3)™, Current Version, or Primavera SureTrak™, Current Version, by Primavera Systems, Inc. or current mandated scheduling program. Save files in Concentric P3 or current mandated scheduling program file format, compatible with the Government's version of the scheduling program. Importing data into P3/SureTrak/current mandated scheduling program using data conversion techniques or third party software will be cause for rejection of the submitted schedule.

1.5 QUALIFICATIONS

The designated Scheduler for the project shall have prepared and maintained at least 3 previous schedules of similar size and complexity as this contract using SureTrak/P3 or current mandated scheduling program. A resume outlining the qualifications of the Scheduler shall be submitted for acceptance to the Contracting Officer. Payment will not be processed until an acceptable Scheduler is provided.

1.6 NETWORK SYSTEM FORMAT

The system shall include time scaled logic diagrams and specified reports.

1.6.1 Diagrams

Provide Time-scaled Logic Diagram printed in color on ANSI D size sheets. The diagram shall clearly show activities on the critical path. Include the following information for each activity:

a. Activity ID

b. Activity Description

c. Original Duration in Work Days

d. Remaining duration

e. Percent Complete

f. Early Start Date

g. Early Finish Date

h. Total Float

1.6.2 Schedule Activity Properties and Level of Detail

The NAS shall identify all Design, Government, Construction Quality Management (CQM), Construction activities planned for the project and all other activities that could impact project completion if delayed. Separate activities shall be created for each Phase, Area, Floor Level and Location the activity is occurring. Activity categories included in the schedule are specified below.

With the exception of the Contract Award and Contract Completion Date (CCD) milestone activities, no activity shall be open-ended; each activity shall have predecessor and successor ties. Once an activity exists on the schedule it may not be deleted or renamed to change the scope of the activity and shall not be removed from the schedule logic without approval from the Contracting Officer. The ID number for a deleted activity shall not be re-used for another activity. No more than 20 percent of the activities shall be critical or near critical. Critical is defined as having zero days of Total Float. "Near Critical" is defined as having Total Float of 1 to 14 days. Contractor activities shall be driven by calendars that reflect Saturdays, Sundays and all Federal Holidays as non-work days.

1.6.2.1 Activity Categories

a. Design Activities: Design activities shall include design decision points, design submittal packages, including any critical path submittals for Fast Tracked Phases. Review times for design development packages shall be included in the schedule. Refer to Section 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES for specific requirements.

b. Procurement Activities: Examples of procurement activities include, but are not limited to; Material/equipment submittal preparation, submittal and approval of material/equipment; material/equipment fabrication and delivery, and material/equipment on-site. As a minimum, separate procurement activities will be provided for critical items, long lead items, items requiring government approval and material/equipment procurement for which payment will be requested in advance of installation. The Contractor shall show each delivery with relationship tie to the Construction Activity specifically for the delivery.

c. Government Activities: Government and other agency activities that could impact progress shall be clearly identified. Government activities include, but are not limited to; Government approved submittal reviews, Government conducted inspections/tests, environmental permit approvals by State regulators, utility outages, Design Start, Construction Start (including Design/Construction Start for each Fast-Track Phase), and delivery of Government Furnished Material/Equipment.

d. Contractor Quality Management (CQM) Activities: CQM Activities shall identify the Preparatory Phase and Initial Phase for each Definable Feature of Work identified in the Contractor's Quality Control Plan. These activities shall be added to each Three-Week Look Ahead Schedule referenced in the paragraph entitled "THREE-WEEK LOOK AHEAD SCHEDULE" and will also be included in each monthly update. The Follow-up Phase will be represented by the Construction Activities in the Baseline Schedule and in the schedule updates.

e. Construction Activities: No on-site construction activity shall have a duration in excess of 20 working days. Separate construction activities shall be created for each Phase, Area, Floor Level and Location where the activity is occurring. Contractor activities shall be driven by calendars that reflect Saturdays, Sundays and all Federal Holidays as non-work days, unless otherwise defined in this contract.

f. Turnover and Closeout Activities: Include a separate section with all items on the "Facility Turnover Checklist" that are applicable to this project. The initial checklist will be provided with the bid documents. As a minimum, this will include all testing, specialized inspection activities, Pre-Final inspection, Punch List Completion, Final Inspection and Acceptance. Add a milestone for the Facility Turnover Planning Meeting at approximately 75% construction contract completion or three to six months prior to Projected Completion Date or Contract Completion Date (CCD), whichever is sooner.

1.6.2.2 Contract Milestones and Constraints

a. Project Start Date Milestones: The Contractor shall include as the first activity on the schedule a start milestone titled "Contract

Award", which shall have a Mandatory Start constraint equal to the Contract Award Date.

b. Projected Completion Date Milestone: The Contractor shall include an unconstrained finish milestone on the schedule titled "Projected Completion". Projected Completion is defined as the point in time the Government would consider the project complete and ready for its intended use. This milestone shall have the Contract Completion (CCD) milestone as its only successor.

c. Contract Completion Date (CCD) Milestone: The Contractor shall include as the last activity on the schedule a finish milestone titled "Contract Completion (CCD)", which shall have a Mandatory Finish constraint equal to the current Contract Completion Date. Calculation of schedule updates shall be such that if the finish of the "Projected Completion" milestone falls after the contract completion date, then negative float will be calculated on the longest path and if the finish of the "Projected Completion" milestone falls before the contract completion date, the float calculation shall reflect positive float on the longest path. The only predecessor to the Contract Completion Date Milestone shall be the Projected Completion milestone.

1.6.2.3 Activity Code

At a minimum, the Contractor shall establish activity codes identified in this specification and 3 additional activity codes identified by the Contracting Officer. Once established, activity codes and values cannot be changed without approval by the Contracting Officer.

a. Phase: All activities shall be assigned a 4-digit code value based on the contract phase it occurs in.

b. Area Code: All activities shall be assigned an area code value identifying the Area in which the activity occurs. Activities shall not belong to more than one area. Area is defined as a distinct space, function or activity category; such as, separate structure(s), sitework, project summary, construction quality management, material/equipment procurement, etc.

c. Work Item: All activities in the project schedule shall be assigned a 4-digit Work Item code value. Examples of Work Item code values include but are not limited to water lines, drain lines, building pad and foundation, slab on grade, walls and columns, suspended slab, roof structure, roofing, exterior finish systems, interior rough-in, and finishes, etc.

d. Location 1: Assign a 4-digit Location 1 code value to activities associated with multistory structures. Code values are used to identify the floor level where an activity is occurring.

e. Location 2: Assign a 4-digit Location 2 code value to all activities to identify the location within an Area, Work Item or Building Level that an activity is occurring.

f. Responsibility Code: All activities in the project schedule shall be identified with the party responsible for completing the task. Activities shall not belong to more than one responsible party.

1.6.2.4 Anticipated Weather Delays

The Contractor shall use the National Oceanic and Atmospheric Administration's (NOAA) historical monthly averages for the NOAA location closest to the project site as the basis for establishing a "Weather Calendar" showing the number of anticipated non-workdays for each month due to adverse weather, Saturdays, Sundays and all Federal Holidays as non-work days.

Assign the Weather Calendar to any activity that could be impacted by adverse weather. The Contracting Officer will issue a modification in accordance with the contract clauses, giving the Contractor a time extension for the difference of days between the anticipated and actual adverse weather delay if the number of actual adverse weather delay days exceeds the number of days anticipated for the month in which the delay occurs and the adverse weather delayed activities critical to contract completion. A lost workday due to weather conditions is defined as a day in which the Contractor cannot work at least 50 percent of the day on the impacted activity.

1.6.2.5 Cost Loading

a. Cost Loading Activities: Costs for incremental design preparation shall be assigned to the respective design phase submittal milestone(s). Material and Equipment Costs for which payment will be requested in advance of installation shall be assigned to their respective procurement activity (i.e., the material/equipment on-site activity). All other construction costs shall be assigned to their respective Construction Activities. The value of inspection/testing activities will not be less than 10 percent of the total costs for Procurement and Construction Activities. Evenly disperse overhead and profit to each activity over the duration of the project.

b. Quantities and Units of Measure: Each cost loaded activity shall have a detailed quantity breakdown and unit of measure.

1.6.3 Schedule Software Settings and Restrictions

a. Activity Constraints: Date/time constraint(s), other than those required by the contract, will not be allowed unless accepted by the Contracting Officer. Identify any constraints proposed and provide an explanation for the purpose of the constraint in the Narrative Report.

b. Default Progress Data Disallowed: Actual Start and Actual Finish dates on the CPM schedule shall match the dates on the Contractor Quality Control and Production Reports.

c. Software Settings: Schedule calculations and Out-of-Sequence progress (if applicable) shall be handled through Retained Logic, not Progress Override. All activity durations and float values will be shown in days. Activity progress will be shown using Remaining Duration. Default activity type will be set to "Task". The project "Must Finish By" date shall be left blank.

1.6.4 Required Tabular Reports

The following reports shall be included with the schedule and update submittals:

a. Log Report: Listing of all changes made between the previous schedule and current updated schedule.

b. Narrative Report: Identify and justify:

1. Progress made in each area of the project.

2. Critical Path.

3. Date/time constraint(s), other than those required by the contract.

4. Changes in the following; added or deleted activities, original and remaining durations for activities that have not started, logic, milestones, planned sequence of operations, critical path, and cost loading.

5. Any decrease in previously reported activity Earned Amount.

6. Pending items and status thereof, including permits, change orders, and time extensions.

7. Status of Contract Completion Date and interim milestones.

8. Current and anticipated delays (describe cause of delay and corrective actions(s)).

9. Description of current and future schedule problem areas.

Each entry in the narrative report will cite the respective Activity ID and Activity Description, the date and reason for the change, and description of the change.

c. Earned Value Report: Listing all activities having a budget amount cost loaded. Compilation of total earnings on the project from notice to proceed to current progress payment request. Group and sort activities as directed by the Contracting Officer. Show current budget, previous physical percent complete, to-date physical percent complete, previous earned value, to-date earned value and cost to complete on the report for each activity.

d. Schedule Variance Control (SVC) Diagram: With each schedule submission, provide a SVC diagram showing:

1. Cash Flow S-Curves indicating planned project cost based on projected early and late activity finish dates.

2. Earned Value to-date.

Revise Cash Flow S-Curves when the contract is modified, or as directed by the Contracting Officer.

1.7 SUBMISSION AND ACCEPTANCE

The Design Baseline NAS shall include detailed design activities, general (summarized) approach for the construction phase(s) of the project and required milestone activities. If the project is being Fast-Tracked or allows Early Start of construction, the Design Baseline Project Schedule shall include all fast-tracked design construction phases, etc., including the required or proposed critical path design submittals within each phase

that shall occur during the duration of the project.

The Contractor shall develop the Construction Baseline Schedule with detailed construction activities as design progresses. If design must be completed and accepted prior to construction, submit the complete design and construction network analysis schedule and obtain acceptance prior to starting construction work. If the project will be Fast-Tracked, each construction stage shall be detailed and built upon the previous Fast-Tracked Baseline Schedule (including any interim updates) and accepted prior to starting that stage of the construction work. Payment for completed work is dependent on an accepted, detailed schedule for that portion of work.

1.7.1 Monthly Network Analysis Schedule Updates

Contractor and Government representatives shall meet at monthly intervals to review and agree on the information presented in the updated project schedule. The submission of an acceptable, updated schedule to the Government is a condition precedent to the processing of the Contractor's pay request. If a Schedule of Prices is the basis for progress payments, it shall be consistent with the logic and activity breakdowns on the progress schedule. If progress payments are based on a cost-loaded schedule, the Contractor and Government shall agree on percentage of payment for each activity progressed during the update period.

Provide the following with each Schedule submittal:

a. Time Scaled Logic Diagram.

b. Reports listed in paragraph entitled "Required Tabular Reports."

c. Data disks containing the project schedule. Include the back-up native .prx/current mandated schedule program files.

1.7.2 As-Built Schedule

As a condition precedent to the release of retention and making final payment, submit an "As-Built Schedule," as the last schedule update showing all activities at 100 percent completion. This schedule shall reflect the exact manner in which the project was actually constructed.

1.8 CONTRACT MODIFICATION

Submit a Time Impact Analysis with each cost and time proposal for a proposed change. Time Impact Analysis (TIA) shall illustrate the influence of each change or delay on the Contract Completion Date or milestones. No time extensions will be granted nor delay damages paid unless a delay occurs which consumes all available Project Float, and extends the Projected Finish beyond the Contract Completion Date.

a. Each TIA shall be in both narrative and schedule form demonstrating the delay impact. The TIA shall identify the predecessors to the new activities and demonstrate the impacts to successor activities. The Contractor shall run the schedule calculations and submit the impacted schedule with the proposal or claim.

b. The TIA schedule submitted with the proposal shall show all activity progress as of the date of the proposal. If the impact to the schedule occurs prior to the proposal submission, the TIA schedule shall be

updated to show all activity progress as of the time of the impact. If the proposed change does not impact the CCD, no TIA shall be required.

c. Submit Data disks containing the TIA schedule. Include the back-up native .prx/current mandated schedule program files.

d. Unless the Contracting Officer requests otherwise, only conformed contract modifications shall be added into the Project NAS.

1.9 FLOAT

Project Float is the length of time between the Contractor's Projected Finish Milestone and the Contract Completion Date Milestone. Project Float available in the schedule, at any time shall not be for the exclusive use of either the Government of the Contractor.

1.10 THREE-WEEK LOOK AHEAD SCHEDULE

The Contractor shall prepare and issue a 3-Week Look Ahead schedule to provide a more detailed day-to-day plan of upcoming work identified on the Project Network Analysis Schedule. The work plans shall be keyed to NAS activity numbers and updated each week to show the planned work for the current and following two-week period. Additionally, include upcoming outages, closures, preparatory meetings, and initial meetings. Identify critical path activities on the Three-Week Look Ahead Schedule. The detail work plans are to be bar chart type schedules, maintained separately from the Project NAS on an electronic spreadsheet program and printed on 8.5 by 11 inch sheets as directed by the Contracting Officer. Activities shall not exceed 5 working days in duration and shall have sufficient level of detail to assign crews, tools and equipment required to complete the work. Three hard copies and one electronic file of the 3-Week Look Ahead Schedule shall be delivered to the Contracting Officer no later than 8 a.m. each Monday and reviewed during the weekly CQC Coordination Meeting.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

-- End of Section --

SECTION 01 33 00.05 20

CONSTRUCTION SUBMITTAL PROCEDURES
04/10

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

This section covers construction submittals that are not included in the design submittals. Submit design submittals in accordance with 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES.

1.2 SUBMITTAL DESCRIPTIONS (SD)

Submittal requirements are specified in Unified Facilities Guide Specifications (UFGS) in Part 2, GENERAL REQUIREMENTS; in references in Part 4 PERFORMANCE TECHNICAL SPECIFICATIONS; and in UFGSs in Part 5, PRESCRIPTIVE SPECIFICATIONS. Submittals that are identified by SD numbers use descriptions of items included in submittal packages and titles as follow:

SD-01 Preconstruction Submittals

Certificates of insurance.
Surety bonds.
List of proposed subcontractors.
List of proposed products.
Construction Progress Schedule.
Submittal register.
Schedule of values.
Health and safety plan.
Work plan.
Quality control and Commissioning plan.
Environmental protection plan.

SD-02 Shop Drawings

Drawings, diagrams and schedules specifically prepared to illustrate some portion of the work.

Diagrams and instructions from a manufacturer or fabricator for use in producing the product and as aids to the Contractor for integrating the product or system into the project.

Drawings prepared by or for the Contractor to show how multiple systems and interdisciplinary work will be coordinated.

SD-03 Product Data

Catalog cuts, illustrations, schedules, diagrams, performance charts, instructions and brochures illustrating size, physical appearance and other characteristics of materials or equipment for some portion of the work.

Samples of warranty language when the contract requires extended product warranties.

SD-04 Samples

Physical examples of materials, equipment or workmanship that illustrate functional and aesthetic characteristics of a material or product and establish standards by which the work can be judged.

Color samples from the manufacturer's standard line (or custom color samples if specified) to be used in selecting or approving colors for the project.

Field samples and mock-ups constructed on the project site establish standards by which the ensuring work can be judged. Includes assemblies or portions of assemblies which are to be incorporated into the project and those which will be removed at conclusion of the work.

SD-05 Design Data

Calculations, mix designs, analyses or other data pertaining to a part of work.

SD-06 Test Reports

Report signed by authorized official of testing laboratory that a material, product or system identical to the material, product or system to be provided has been tested in accord with specified requirements. (Testing must have been within three years of date of contract award for the project.)

Report which includes findings of a test required to be performed by the Contractor on an actual portion of the work or prototype prepared for the project before shipment to job site.

Report which includes finding of a test made at the job site or on sample taken from the job site, on portion of work during or after installation.

Investigation reports.

Daily checklists.

Final acceptance test and operational test procedure.

SD-07 Certificates

Statements signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements. Must be dated after award of project contract and clearly name the project.

Document required of Contractor, or of a supplier, installer or subcontractor through Contractor, the purpose of which is to further quality of orderly progression of a portion of the work by documenting procedures, acceptability of methods or personnel qualifications.

Confined space entry permits.

SD-08 Manufacturer's Instructions

Preprinted material describing installation of a product, system or

material, including special notices and Material Safety Data sheets concerning impedances, hazards and safety precautions.

SD-09 Manufacturer's Field Reports

Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.

Factory test reports.

SD-10 Operation and Maintenance Data

Data that is furnished by the manufacturer, or the system provider, to the equipment operating and maintenance personnel. This data is needed by operating and maintenance personnel for the safe and efficient operation, maintenance and repair of the item.

SD-11 Closeout Submittals

Documentation to record compliance with technical or administrative requirements or to establish an administrative mechanism.

Special requirements necessary to properly close out a construction contract. For example, Record Drawings, As-built drawings, DD Form 1354, and Sustainable and Energy Data Record Card. Also, submittal requirements necessary to properly close out a major phase of construction on a multi-phase contract.

1.3 SUBMITTALS

The use of a "G" following a submittal indicates that an approval action is required, either by the Government or by the Contractor's Designer of Record (DOR) or QC Specialist.

Submit the following in accordance with the requirements of this section.

SD-01 Preconstruction Submittals

Submittal Register Format; G

Submittal Register; G

1.3.1 Submittal Register

The submittal register will be prepared during the initial design stages of the project and indicate each design and construction submittal. Maintain an electronic version of the submittal register as work progresses. The DOR must assist the DQC in preparing the submittal register by determining all project submittals that require DOR approval. The Contractor proposed submittal register format must include all types of information pertinent to the submittal process and be approved by the Contracting Officer prior to the first submission.

1.4 CONSTRUCTION QUALITY CONTROL

1.4.1 Contractor Reviewing, Certifying, Approving Authority

The QC organization is responsible for reviewing and certifying that

submittals are in compliance with the contract requirements.

In RFP PART 4 PERFORMANCE TECHNICAL SPECIFICATIONS (PTS), there are UFGS specification sections required to be submitted as part of the design submittal. Unless specified otherwise in this section, the Contractor's DOR is the approving authority for submittals listed in these UFGS specifications with a "G" designation, unless the DOR delegates to Contractor Quality Control approval. RFP Part 4 PTS sections also include submittals identified for DOR approval that are not denoted with a "G" designation, these submittals cannot be delegated for Contractor Quality Control approval.

If RFP PART 5 PRESCRIPTIVE SPECIFICATIONS are utilized in this RFP, the Contractor's DOR is the approving authority for submittals listed with a "G" designation, unless the DOR delegates to Contractor Quality Control approval.

DOR shall approve construction submittals that are incorporated in the design submittal prior to being submitted to the Government for design submittal approval. Indicate approval of these construction submittals on the accompanying submittal register for that design package.

Submittal items identified in RFP PARTS 2, 4, and 5 that are not identified with a "G" designation or not designated for DOR approval (in RFP Part 4) are for Contractor Quality Control approval.

Construction submittals that are approved by the DOR or certified by the QC are not required to be submitted to the Government for surveillance, except where specified in paragraph SUBMITTALS RESERVED FOR GOVERNMENT SURVEILLANCE.

Construction submittals not requiring Government approval or surveillance shall be submitted for information.

1.4.2 Submittals Reserved for Government Approval

The Government is the approving authority for submittals with a "G" designation in RFP Part 2 GENERAL REQUIREMENTS, specification sections. Comply with additional Government approval requirements for Environmental submittals, as specified in RFP Part 2, Section 01 57 19.00 20 TEMPORARY ENVIRONMENTAL CONTROLS and 01 57 19.01 20 SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS.

In addition to the Government approvals required by RFP Part 2 GENERAL REQUIREMENTS, the following submittals shall be certified by the QC Manager and the DOR, and approved by the Contracting Officer.

a. FIRESTOPPING; All fire protection system submittals; G

b. INTERIOR FIRE ALARM SYSTEM; All fire protection system submittals; G

c. FIRE SUPPRESSION SPRINKLERS; All fire protection system submittals; G

d. BACnet DIRECT DIGITAL CONTROL SYSTEMS FOR HVAC; SD-06 field test report submittals; G

e. HVAC TESTING/ADJUSTING/BALANCING; All submittals; G

f. PAD-MOUNTED TRANSFORMERS; All submittals; G

g. SUBSTATIONS; All submittals; G

h. SWITCHGEAR; All submittals; G

i. ELEVATORS; All submittals; G

1.4.2.1 Scheduling for Government Approved Submittals

Except as specified otherwise, allow review period, beginning when Government receives submittal from the QC organization, of 20 working days for return of submittal to the Contractor. Period of review for submittals with Contracting Officer approval begins when Government receives submittal from QC organization. Period of review for each resubmittal is the same as for initial submittal.

1.4.3 Submittals Reserved for Government Surveillance

Surveillance submittals are approved by the Contractor in accordance with paragraph CONTRACTOR REVIEWING, CERTIFYING, AND APPROVING AUTHORITY, but provide the Government the opportunity to oversee critical project issues.

If during the Government surveillance of construction submittals, items are brought to the Contractor's attention as non-compliant, the Contractor shall correct the submittal and construction to comply with the requirements of the RFP. Stamp surveillance submittals "APPROVED" by the DOR or QC Specialist and "FOR SURVEILLANCE ONLY." Submit the following Government surveillance submittals, prior to starting work for construction submittal items, and after the completion of the work for reports submittals items.

a. Submit fire protection related submittals pertaining to spray-applied fire proofing and fire stopping, exterior fire alarm reporting systems, interior fire alarm & detection systems, and fire suppression systems including fire pumps and standpipe systems.

b. Submit geotechnical related submittals pertaining to the soils investigations (reports and soils analysis), foundations (shallow and deep), pavements structure design, test pile and production pile testing and installation.

c. Submit conveying related submittals pertaining to elevators, escalators, weight handling equipment, lifts, and conveyors.

d. Submit roofing submittals pertaining to materials and systems used to make up the roof system.

e. Submit HVAC Testing, Adjusting, and Balancing required submittals.

f. Submit telecommunications shop drawings, as described in Part 4, D50 ELECTRICAL, for coordination with the NMCI Contractor.

g. Submit Performance Verification and Acceptance Testing submittals listed in the PTS and referenced UFGS.

h. Submit all Interim Special Inspection Reports on a bi-weekly basis

until work requiring special inspections is complete. Submit all Structural Observation Reports and the Final Report of Special Inspections.

i. Submit Final LEED Certification Documentation for US Green Building Council Certification.

j. Submit building envelope testing results for air tightness and the Infrared Thermography results if air barrier deficiencies are identified. Actions taken to correct building envelope deficiencies at each location.

1.4.4 Constraints

a. Submittals shall be complete for each definable feature of work; submit components of definable feature interrelated as a system at the same time.

b. Approval of a separate material, product, or component does not imply approval of assembly in which item functions.

1.4.5 Variations

Variations from contract requirements require Government approval and will be considered where advantageous to the Government.

1.4.5.1 Considering Variations

Variations from contract requirements including the solicitation, the accepted proposal, and the final design, require Government approval and will be considered where advantageous to the Government. Variations to the contract requirements must be approved by the Designer of Record prior to submittal to the Government for approval of the Variation.

1.4.6 Contractor's Responsibilities

Ensure no work has begun until submittals for that work have been "approved" or "approved as noted."

1.4.7 QC Organization Responsibilities

Stamp each sheet of each submittal with QC certifying statement or approving statement, except that data submitted in bound volume or on one sheet printed on two sides may be stamped on the front of the first sheet only.

a. When approving authority is Contracting Officer, QC organization will certify submittals, assure proper signatures, and forward to Contracting Officer with the following certifying statement:

"I hereby certify that the (equipment) (material) (article) shown and marked in this submittal is that proposed to be incorporated with contract Number (insert contract number here), is in compliance with the contract documents, can be installed in the allocated spaces, and is submitted for Government approval.

RFP Part Two Submittals:

Certified by QC Manager _____, Date _____

(QC Manager)

RFP Part Four and Part Five Submittals:

Certified by DOR _____, Date _____

Certified by QC Manager _____, Date _____"

(1) Sign certifying statement or approval statement. The person signing certifying statements shall be QC organization member designated in the approved QC plan. The signatures shall be in original ink. Stamped signatures are not acceptable.

(2) Update submittal register database as submittal actions occur and maintain the submittal register at project site until final acceptance of all work by Contracting Officer.

(3) Retain a copy of approved submittals at project site, including Contractor's copy of approved samples.

b. When the Approving Authority is Designer of Record, the DOR shall approve, professionally stamp, sign, and date submittals. DOR stamp on construction submittals or submission of design documents that include construction submittals indicates DOR approval for construction. QC organization will certify submittals, assure proper signatures, and forward to Contracting Officer with the following certifying statement:

"I hereby certify that the (equipment) (material) (article) shown and marked in this submittal is that proposed to be incorporated with contract Number (insert contract number here), is in compliance with the contract requirements, can be installed in the allocated spaces, and is submitted for DOR approval.

RFP Part Four and Part Five Submittals:

Approved by DOR _____, Date _____

Certified by QC Manager _____, Date _____"

(1) Sign certifying statement or approval statement. The person signing certifying statements shall be QC organization member designated in the approved QC plan. The signatures shall be in original ink. Stamped signatures are not acceptable.

(2) Update submittal register database as submittal actions occur and maintain the submittal register at project site until final acceptance of all work by Contracting Officer.

(3) Send copies of final DOR or QC Specialist approved and signed submittals that are identified in this section for Government surveillance to the Contracting Officer. Stamp copies "For Surveillance Only."

1.4.8 Government's Responsibilities

When approving authority is the Contracting Officer, the Government will:

a. Note date on which submittal was received from QC Manager, on each submittal.

b. Review submittals for compliance with contract documents.

1.4.8.1 Government Actions

Submittals will be returned with one of the following notations:

a. Submittals marked "approved" or "approved as submitted" authorize Contractor to proceed with work covered.

b. A submittal marked "not reviewed" will be returned with an explanation of the reason it was not reviewed.

c. Submittals marked "approved as noted" or "approval except as noted; resubmission not required" authorize Contractor to proceed with work as noted provided Contractor takes no exception to the notations.

d. Submittals marked "revise and resubmit" or "disapproved" indicate submittal is incomplete or does not comply with design concept or requirements of the contract documents and shall be resubmitted with appropriate changes. No work shall proceed for this item until resubmittal is approved.

e. Submittals required for surveillance will be returned only if corrective actions are required.

1.5 FORMAT OF SUBMITTALS

1.5.1 Transmittal Form

Transmit submittals with transmittal form prescribed by Contracting Officer and standard for the project.

1.5.1.1 Combined Design and Construction Submittal Notification

Indicate on the design submissions transmittal form, which construction submittals have been combined with the design documents. Coordinate transmittal form list of combined design and construction submittals with submittal register to indicate DOR approval of all combined submittals.

1.6 QUANTITY OF SUBMITTALS

1.6.1 1.6.1 Quantity of Submittals Reserved for Government Approval

Submit four copies of submittals of shop drawings requiring review and approval by Contracting Officer.

1.6.2 Quantity of Submittals Reserved for Government Surveillance

Submit three copies of submittals specified for surveillance to the Contracting Officer if not electronically submitted. Submit two additional copies of elevator submittals directly to the NAVFAC Elevator Specialist

responsible for the NAVFAC elevator certification of the project.

1.6.3 Quantity of Submittals for Information

Submit two copies of submittals for information to the Contracting Officer.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

SECTION 01 33 10.05 20

DESIGN SUBMITTAL PROCEDURES
04/10

PART 1 GENERAL

1.1 SUMMARY

This section includes requirements for Contractor-originated design documents and design submittals.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. The latest version of the publication at time of award shall be used.

U.S. GREEN BUILDING COUNCIL (USGBC)

LEED	(2002; R 2005) Leadership in Energy and Environmental Design(tm) Green Building Rating System for New Construction (LEED-NC)
LEED Reference Guide	(2005) LEED-NC Reference Guide for New Construction

U.S. DEPARTMENT OF DEFENSE (DOD) UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	General Building Requirements
UFC 1-300-08	Criteria for Transfer and Acceptance of Military Real Property Handbook
UFC 1-300-09N	Design Procedures
UFC 3-100-10	Architecture
UFC 3-120-10	Interior Design
UFC 3-200-10N	Civil
UFC 3-201-02	Landscape
UFC 3-220-01N	Geotechnical Engineering Procedures for Foundation Design of Buildings and Structures
UFC 3-301-01	Structural Engineering
UFC 3-400-01	Energy Conservation
UFC 3-400-10N	Mechanical
UFC 3-501-01	Electrical Engineering

UFC 3-600-01	Fire Protection Engineering for Facilities
UFC 3-600-10N	Fire Protection
UFC 3-800-10N	Environmental
UFC 4-030-01	Sustainable Development

1.3 GENERAL DOCUMENTATION REQUIREMENTS

Contractor-originated design documents shall represent a project design that complies with the Request For Proposal (RFP), UFC 1-300-09N and the architectural and engineering discipline UFC's design guidance listed below.

a. UFC 1-200-01

b. UFC 3-100-10

c. UFC 3-120-10

d. UFC 3-200-10N

e. UFC 3-201-02

f. UFC 3-220-01N

g. UFC 3-301-01

h. UFC 3-400-01

i. UFC 3-400-10N

j. UFC 3-501-01

k. UFC 3-600-01

l. UFC 3-600-10N

m. UFC 3-800-10N

n. UFC 4-030-01

1.4 SUBMITTALS

Submit design submittals to the Government for approval. The use of a "G" following a submittal indicates that a Government approval action is required. Submit the following in accordance with this section and Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES.

SD-01 Preconstruction Submittals

Consolidated RFP Documents; G

Submittal Register; G

SD-04 Samples

Final framed rendering and copies; G

SD-05 Design Data

Design Drawings; G

Specifications; G

Design Analysis; G

DD Form 1354; G

Design Submittals; G

Sustainable Design; G

Project Rendering; G

Facility Recognition Plaque; G

SD-07 Certificates

LEED Green Building Rating System (GBRS); G

LEED Certification Registration Application; G

LEED Certification; G

SD-11 Closeout Submittals

Record Documents; G

NAVFAC Sustainable and Energy Data Record Card; G

DD Form 1354; G

1.5 DESIGN QUALITY CONTROL

1.5.1 Contractor Reviewing and Certifying Authority

The QC organization is responsible for reviewing and certifying that design submittals are in compliance with the contract requirements.

1.5.2 Government Approving Authority

The Contracting Officer is the approving authority for design submittals.

1.5.3 Designer of Record Certifying Authority

The Designer of Record (DOR), as registered and defined in UFC 1-300-09N, is the design certifying authority. The DOR accepts responsibility for design of work in each respective design discipline, by stamping and approving final construction drawings submitted to the Government approval authority.

1.5.4 Contractor Construction Actions

Upon submission of sealed and signed design documents certified by the DOR, Design Quality Control (DQC) Manager and the Quality Control (QC) Managers, the Contractor may proceed with material and equipment purchases, fabrication and construction of any elements covered by that submittal.

1.5.5 Contractor's Responsibilities

a. Designate a lead licensed architect or engineer to be in responsible charge to coordinate the design effort of the entire project. This lead architect or engineer shall coordinate all design segments of the project to assure consistency of design between design disciplines.

b. With the Designer or Record, verify site information provided in the RFP. In addition, provide additional field investigations and verification of existing site conditions as may be required to support the development of design and construction of the project.

c. Advise Contracting Officer of variations, as required by paragraph "Variations."

d. Provide an updated, cumulative submittal register with each design package that identifies the design and construction submittals required by that design package and previous submittals.

1.5.6 QC Organization Responsibilities

a. Both the CA and the QC Manager must certify design submittals for compliance with the contract documents. The DOR stamp on drawings indicates approval from the DOR.

b. QC organization shall certify submittals forwarded by the Designer of Record (DOR) to the Contracting Officer with the following certifying statement:

"I hereby certify that the (equipment) (material) (article) shown and marked in this submittal is that proposed to be incorporated with Contract Number (insert contract number here), is in compliance with the contract documents, and is submitted for Government approval.

Certified by Design Quality Control (DQC) Manager

_____, Date _____

Certified by QC Manager

_____, Date _____"

c. Sign certifying statement. The persons signing certifying statements shall be the QC organization members designated in the approved QC plan. The signatures shall be in original ink. Stamped signatures are not acceptable.

d. Update submittal register as submittal actions occur and maintain the submittal register at project site until final approval of all work by Contracting Officer.

e. Retain a copy of approved submittals at project site.

1.5.7 Government Responsibilities

The Government will

a. Note date on which submittal was received from QC manager, on each submittal.

b. Perform a quality assurance (QA) review of submittals. Government will notify Contractor when comments for that design package are posted and ready for Contractor evaluation and resolution.

c. Upon submittal of final design package and resolution of comments by the Contractor, the Government will sign final design package, when approved, and return electronic copy of signed design documents to the Contractor.

1.5.7.1 Actions Possible

Submittals will be returned with one of the following notations:

a. Submittals may be marked "approved."

b. Submittals marked "not reviewed" will indicate submittal has been previously reviewed and approved, is not required, does not have evidence of being reviewed and certified by Contractor, or is not complete. Submittal will be returned with an explanation of the reason it is not reviewed. Resubmit submittals returned for lack of review by Contractor or for being incomplete, with appropriate action, coordination, or change.

c. Submittals marked "revise and resubmit" or "disapproved" indicate submittal is incomplete or does not comply with design concept or requirements of the contract documents and shall be resubmitted with appropriate changes. If work has been started on the unacceptable portion of the design submittal, the Contractor shall propose corrective action. No further work shall proceed until the issue is resolved in a manner satisfactory to the Government.

1.6 DESIGN DRAWINGS

1.6.1 Drawing Standards

Prepare, organize, and present design drawings in accordance with the requirements of UFC 1-300-09N.

Submit all CADD files for the final drawings on CD-ROM disks in AutoCAD 2006 format. Drawing files shall be full files, uncompressed and unzipped.

1.6.2 Naval Facilities (NAVFAC) Engineering Command Drawing Numbers

Number the final Contractor-originated design drawings consecutively with NAVFAC drawing numbers. Determine the total number of sheets required for the complete set of drawings before requesting the NAVFAC drawing numbers from the Contracting Officer.

1.6.3 Seal on Documents

All final Contractor-originated design drawings shall be signed, dated, and bear the seal of the registered architect or the registered engineer of the

respective discipline in accordance with UFC 1-300-09N. This seal shall be the seal of the Designer of Record for that drawing, and who is professionally registered for work in that discipline. A principal or authorized licensed or certified employee shall electronically sign and date final drawings and cover sheet, in accordance with UFC 1-300-09N. Application of the electronic seal and signature accepts responsibility for the work shown thereon.

1.6.4 Units of Measure

Utilize English Inch-Pound units of measure on the design documents.

1.7 SPECIFICATIONS

Provide a Contractor-originated design specification that, in conjunction with the drawings, demonstrates compliance with materials, equipment, execution, and field quality control requirements of the RFP. The specified products, equipment, fixtures, devices, and systems submitted by the Contractor and approved by the Contracting Officer shall be used to construct the project. Part 2 Sections and Prescriptive Technical Sections contained in Part 5 of this RFP shall become a part of the Contractor-originated specification without any changes and as provided in the RFP. The specification coversheet shall be prepared and signed by the lead licensed architect or engineer of the project design team. Indicate the Contractor's company name and address on the specification coversheet of each design submittal.

1.7.1 Specifications Format

The use of UFGS sections are required. Organize the specifications using Construction Specification Institute (CSI) Masterformat™. A prescriptive specification is required for all items. Provide specifications to include the following:

a. Cover sheet and table of contents.

b. Specification sections.

1.7.2 Fire Protection Specifications

Specifications pertaining to spray-applied fire proofing and fire stopping, exterior fire alarm reporting systems, interior fire alarm and detection systems, and fire suppression systems, including fire pumps and standpipe systems shall be either prepared by, or reviewed and approved by the Fire Protection Designer of Record (DOR).

1.7.3 Submittal Register

Submit a current submittal register with each design submittal. Provide a cumulative register that identifies the design and construction submittals required by each design package along with previous submittals. The DOR shall assist in developing the submittal register by determining which submittal items are required to be approved by the DOR. To obtain Government approval of the final design package, complete all fields in the submittal register.

1.7.4 Specification Software

Create the project specification using SpecsIntact and submit the final

Specification source files in SpecsIntact format.

1.8 DESIGN ANALYSIS

Prepare, organize, and present design analysis in accordance with the requirements of UFC 1-300-09N. The design analysis shall be a presentation of facts at the Concept Design Workshop to demonstrate the concept of the project is fully understood and the design is based on sound engineering principles. Provide design analyses for each discipline and include the following:

a. Basis of design that includes:

(1) An introductory description of the project concepts that addresses the salient points of the design;

(2) An orderly and comprehensive documentation of criteria and rationale for system selection; and

(3) The identification of any necessary licenses and permits that are anticipated to be required as a part of the design and/or construction process. The "Permits Record of Decision" (PROD) form provided shall be used for recording permits.

b. Code and criteria search shall identify all applicable codes and criteria and highlight specific requirements within these codes and criteria for critical issues in the facility design.

c. Calculations as specified and as needed to support this design.

d. Section titled "Sustainable Design" that addresses sustainable concepts and LEED Rating Analysis Report prepared by a LEED Accredited Professional recognized by the U.S. Green Building Council.

e. Draft and Final NAVFAC Sustainable and Energy Data Record Card (NSEDRC) that documents the energy usage and sustainable features of the building. Refer to Record Documents paragraphs in this section for requirements.

f. Section titled "Antiterrorism" that documents the antiterrorism features.

g. Fall Protection Analysis

1.8.1 Basis of Design Format

The basis of design for each design discipline shall include a cover page indicating the project title and locations, contract number, table of contents, tabbed separations for quick reference, and bound in separate volumes for each design discipline.

1.8.2 Design Calculations

Place the signature and seal of the designer responsible for the work on the cover page of the calculations for the respective design discipline.

1.8.3 Sustainable Design

Integrate sustainable strategies and features into the design to minimize the energy consumption of the facilities; conserve resources; minimize adverse effects to the environment; and improve occupant productivity, health, and comfort to reduce the total cost ownership of the project using a whole building, life cycle approach. In accordance with the Engineering and Construction Bulletin 2008-1 and other directives, the facility and all site features shall be designed and constructed using LEED..

The minimum sustainable design rating level for the project is to achieve LEED Silver. The LEED Reference Guide credits and additional sustainable requirements in Part Three, 2.3.1 Sustainable Design are mandatory unless not applicable due to project scope. The design and construction shall incorporate sustainable design strategies and features to the fullest extent possible, consistent with mission, budget and client requirements. Ensure sustainable strategies and features in the design phase are incorporated in the construction phase.

Information and resources on sustainable design principles and guidelines are explained in the "Whole Building Design Guide" that can be found at www.wbdg.org.

1.8.3.1 LEED Green Building Rating System (GBRS) Submittals - USGBC Certification

Provide copies of the LEED Certification Registration Application and the complete LEED support documentation to the U.S. Green Building Council (USGBC) to obtain the minimum certificate level specified herein.

a. Provide the following information for the Basis of Design:

(1) A completed LEED Project Checklist indicating all LEED Prerequisites and Credits to be implemented into the facility design and total LEED score for the project.

(2) Description of how each LEED Prerequisite and Credit will be achieved.

(3) List of Architects or Engineers from Contractor's Design Team and who on the team is responsible for implementing each LEED Prerequisite and Credit into the facility design.

(4) Identify the Design Team's USGBC LEED Accredited Professionals.

b. For the submission specified, provide the following:

(1) At 35% Design submittal, provide documentation of the LEED Certification Registration Application.

(2) At 100% Design submittal, provide a LEED Project Checklist preliminary LEED documentation, in the form of a three-ring binder, of all LEED Prerequisites and Credits to be obtained as required by the LEED Rating System.

(3) At final design submittal, update the LEED Project Checklist and LEED documentation binder with any changes and include an electronic copy of the LEED documentation.

(4) Within thirty (30) days of Beneficial Occupancy Date, develop and submit the project case study for the U.S. Department of Energy's Federal Energy Management Program "High Performance Federal Buildings Database" (http://www.eere.energy.gov/femp/highperformance/).

(5) Within sixty (60) days after the beneficial Occupancy Date (BOD), submit LEED Certification Registration Application and complete LEED Certification Documentation to USGBC for certification. After LEED certification is obtained, provide the plaque and 5 color copies of the LEED Certification to the Contracting Officer. Mat and frame the original LEED Certification document.

1.8.3.2 Sustainable Designer

The design team shall include at least one LEED Accredited Professional as recognized by U.S. Green Building Council. The LEED Accredited Professional shall have an active role in the design of the facility and be responsible for implementation and documentation of sustainable strategies and materials in the project.

1.8.3.3 EPA Designated Products

Use products that meet or exceed the minimum requirements of this RFP and the EPA guideline standards for recovered content to the maximum practicable extent in the performance of the contract. See www.epa.gov/cpg/products.htm for a list of EPA designated products and a list of manufacturers and suppliers of EPA designated products.

1.8.4 Fall Protection Analysis

Eliminate fall hazards in the facility or if not feasible provide control measures to protect personnel conducting maintenance work after completion of the project. Identify fall hazards in the Basis of Design with the Design Development and Prefinal submittals. The analysis shall describe how fall hazards are considered, eliminated, prevented or controlled to prevent maintenance personnel from exposure to fall hazards while performing work at heights. Refer to RFP Part 2, Section 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS for fall hazard protection requirements.

1.9 PROJECT RENDERING

Provide a full color rendering of the proposed facility by a company that regularly does this work as a major component of their normal business. Use the final rendering to produce the image for the signboard and the framed photographic copies provided to the Contracting Officer.

1.9.1 Final Framed Rendering and Copies

Provide the final rendering within 30 days of concept design approval. Provide four full size photographic reproduction(s) of the rendering, and three electronic copies in .jpg format on compact disks. Mount the reproductions on acid free board, matted, with metal frames, and utilizing non-glare glass. Print the project name, location, and Architect/Engineer/Contractor firm's name on the matting.

Ship the photographic copies, and the CD's in resilient packaging to ensure damage-free delivery.

Deliver one photographic reproduction and one CD to:

Code OPQC, Marine Corps North Carolina IPT
9742 Maryland Avenue
Norfolk, Virginia 23511-3095

Deliver three photographic reproductions and two CDs to:

IDD Installation Development Division/Facility Planning Branch
Bldg 12, Marine Corps Base
PSC Box 20004
Camp Lejeune, NC 28542-0004
Phone (910) 451-1833

1.10 Facility Recognition Plaque

Provide a facility recognition plaque for this facility in accordance with UFC 1-300-09N, Design Procedures.

1.11 RECORD DOCUMENTS

1.11.1 Record Drawings

The as-built modifications shall be accomplished by electronic drafting methods on the Contractor-originated .DWG design drawings to create a complete set of record drawings.

a. For each record drawing, provide CADD drawing identical to signed Contractor-originated .PDF drawings, that incorporates modifications to the as-built conditions. In addition, copy initials and dates from the Contracting Officer approved .PDF documents to the title block of the record CADD.DWG drawings. The RFP reference or definitive drawings are not required for inclusion in the record set of drawings.

b. After all as-built conditions are recorded on the CADD.DWG files, produce a .PDF and .TIF file of each individual record drawing in conformance with UFC 1-300-09N. Electronic signatures are not required on record drawings.

1.11.2 Source Documents

Provide the specifications, design analysis, reports, surveys, calculations, and any other contracted documents on the CD-ROM disk with the record drawings.

1.11.3 NAVFAC Sustainable and Energy Data Record Card

Submit the NAVFAC Sustainable and Energy Data Record Card (NSEDRC) to document the energy usage and sustainable features of the facility. Follow the instructions provided and fill in the blank editable Adobe .PDF form available on the Whole Building Design Guide at the following web address: http://www.wbdg.org/references/pa_dod_sust_contract.php . Prepare the following submissions;

a. Draft submission. As a part of the Final Design submission the DOR shall complete the NSEDRC and include it as part of the Design Analysis and submit to the Contracting Officer for approval.

b. Final Submission. The Contractor and Designer of Record shall complete the electronic file documenting the NSEDRC with final data and provide the Final Submission 60 days prior to the Beneficial Occupancy Date (BOD) of the facility. The Final submission shall update the Draft submission information. Submit to the Contracting Officer for approval.

1.11.4 DD Form 1354

DOR shall prepare a DD Form 1354 TRANSFER AND ACCEPTANCE OF MILITARY REAL PROPERTY, in accordance with UFC 1-300-08, available at http://65.204.17.188/report/doc_ufc.html. Submit interim form for Government approval a minimum of 30 days prior to final acceptance of work. Submit Final DD Form 1354 at Beneficial Occupancy of facility.

Coordinate with Section 01 20 00.05 20 PRICE AND PAYMENT PROCEDURES FOR DESIGN-BUILD for construction categories and associated category codes. The Contractor's Schedule of Prices shall allocate the total cost of construction to the appropriate category codes.

When documenting demolition work, the DD Form 1354 shall list the quantitative data associated with this work as a negative value to show the cost should be deleted from the Navy asset data store. Coordinate with the Installation Real Property POC to assist in determining the negative value for demolition work.

A Draft version of DD Form 1354 is attached. An Excel version of this document will be provided by the Government.

1.11.4.1 MCB Camp Lejeune

Point of Contact (POC) for assistance in completing the DD Form 1354:

Construction Manager
OICC MCI EAST
1005 Michael Road
Camp Lejeune, NC 28547-2521
Phone: (910) 451-2581

Coordinate with Section 01 20 00.05 20 PRICE AND PAYMENT PROCEDURES paragraph "SCHEDULE OF PRICES" for construction categories and the associated category codes.

The Contractor's Schedule of Prices shall allocate the total cost of construction to the appropriate category codes. If a supporting facility feature has a unique category code, it shall be listed separately on the DD Form 1354. If a supporting facility does not have a unique category code the costs associated with the feature shall be included in the primary facility cost.

When documenting demolition work, the DD Form 1354 shall list the quantitative data associated with this work as a negative value to show the costs should be deleted from the Navy Asset Data Store. Coordinate with the POCs listed above in determining the negative value for demolition work.

The Contractor shall complete DD Form 1354 to the satisfaction of the Construction Manager, OICC MCI EAST.

1.11.5 GEOSPATIAL INFORMATION SYSTEMS (GIS) DELIVERABLES

Provide geospatial data and documents for all features added, demolished or modified as part of this project in accordance with Section 01 78 30.00 22 DIGITAL DATA DELIVERABLES (GIS).

PART 2 PRODUCTS

2.1 CONSOLIDATED RFP DOCUMENTS

Within four weeks after contract award, provide five electronic and hard copies of a consolidated RFP documents incorporating the Contractor's Proposal and all RFP amendments and revisions that are contained in the contract award. Identify the changes to the RFP with the "Red-Lining" or "Track Changes" feature of SpecsIntact or MS Word to highlight the pre-award modifications to the contract. Identify the amendment source at each addition and deletion by annotation, such as footnote or reference in parenthesis.

Submit the specification with the "Redlining/Change" indicated at the Prefinal (100%) submittal; submit the specifications with the changes incorporated, without redlines showing at the Final Design Submittal.

2.2 DESIGN SUBMITTALS

Complete the Contractor-originated design submittals as defined by this contract, and coordinate with the approved design network analysis schedule.

2.2.1 Design Submittal Packages

The Government prefers to review for Quality Assurance (QA) as few submittal packages as possible. Site and Building Design Submittal Packages are required, however Early Start Design Submittals are acceptable if they are substantiated as having an impact to the critical path in the Government approved Network Analysis Schedule. An Early Start submittal shall include all design analyses, drawings, specifications and product data required to fully describe the project element for Government review.

Upon acceptable resolution of Government QA comments for Final Early Start submittals, the Early Start Design will be released to the Contractor for construction. Release of Early Start submittals does not imply final government approval of the design. Upon acceptable resoution of Government QA comments for all Final Design submittals, the entire design package will be released to the Contractor for construction. The Contractor is responsible for cooordinating all design submittals, and is responsible for any changes that may occur between the Final Early Start acceptance and Final Design.

The Site Design may be submitted as an Early Design Submittal Package and shall include the following components:

a. Master Site Plan

b. Demolition Plan

c. Geotechnical

d. Site Work including Environmental, water, sewer, storm drainage, erosion and sediment control, and electrical and mechanical

utilities.

The remaining elements, including foundations, structural systems, building enclosures, interior electrical and mechanical systems, remaining work and furniture/equipment (as applicable) shall be provided in the Building Design Submittal Package.

2.2.2 Required Design Submittals

Provide the following Design Submittal packages. Provide comprehensive, multi-discipline design packages that include design documentation for project elements, fully developed to the design stage indicated, and in accordance with UFC 1-300-09N, except where specified otherwise.

a. Concept Design presented at Concept Design Workshop approximately 20% to 30% design.

b. Early Start Design (approximately 70% to 90% design, provide red-lined specifications) and Building Design Development (35%-50% design) - Government QA. 21 calendar day Government review time.

c. Final Site Design (include final specifications) and Prefinal Building Design (provide red-lined specifications)- Government QA. 21 calendar day Government review time.

d. Final Building Design (Complete, ready for Construction. Proivde specifications with changes incorporated). - 14 calendar day Government review time. Government QA

2.2.3 Review Copies of Design Submittal Packages

a. Provide copies of each design submittal package for review to the following reviewers. Addresses for mailing will be furnished at the PAK meeting.

(1) 9 paper copies of half-size (11" X 17") design drawings only plus 3 CD copies of the complete submittal to the NAVFAC component (Marine Corps, North Carolina IPT, Code OPQC.

(2) 4 paper copies plus 2 CD copies to the Resident Officer in Charge of Construction.

(3) 5 copies plus 2 CD copies to the Activity POC (IDD) (2 copies plus 1 CD copy for final design submittal.)

(4) 1 paper copy plus 1 CD copy to:
USMC: (100% plans only)
Headquarters, U.S. Marine Corps
Security Division, Attn: PhySec Chief
Pentagon, Room 4A324
Washington, DC 20380-1775
(703) 692-4333/4496

(5) 1 paper copy plus 1 CD copy to:
SPAWAR Charleston: (35% to 100% plans)
Commanding Officer
Space and Naval Warfare Systems Center Charleston
ATTN: Code 74M/Steven Leya
P.O. Box 190022

North Charleston, SC 29419-9022
(843) 218-4490

b. Provide the same quantities of copies for resubmittals, as required for each design submittal.

2.3 IDENTIFICATION OF DESIGN SUBMITTALS

Provide a title sheet to clearly identify each submittal, the completion status, and the date. The title sheet shall use the standard format indicated in the UFC 1-300-09N for title sheets. The title sheet shall be unique to a particular design submittal. Submit the project title sheet with design status and date for the design submittals.

2.3.1 Early Start Submittal Title Sheet

Identify Early Start submittals as such, and include a title sheet indicating the type of Early Start submittal, the status, and the date.

PART 3 EXECUTION

3.1 CONTRACTOR'S RESOLUTION OF COMMENTS

Provide written responses to all written comments by the Government. Resubmittal of an unacceptable design submittal shall be a complete package that includes all the required, specified components of that design submittal. **Government required resubmittal due to nonconformance to the contract is not a delay in the contract.**

3.2 VARIATIONS

Variations from contract requirements require Government approval and will be considered where advantageous to the Government. The Designer of Record must approve any proposed variation prior to submittal to the Government.

3.3 THE CONTRACT AND ORDER OF PRECEDENCE

3.3.1 Contract Components

The contract consists of the solicitation, the approved proposal, and the final design.

3.3.2 Order of Precedence

NFAS Clause 5252.236-9312. In the event of a conflict or inconsistency between any of the below described portions of the conformed contract, precedence shall be given in the following order:

a. Any portions of the proposal or final design that exceed the requirements of the solicitation.

(1) Any portion of the approved proposal that exceeds the final design.

(2) Any portion of the final design that exceeds the proposal.

(3) Where portions within either the proposal or the final design conflict, the portion that most exceeds the requirements of the solicitation has precedence.

b. The requirements of the solicitation, in descending order of precedence:

(1) Standard Form 1442, Price Schedule, and Davis Bacon Wage Rates.

(2) Part 1 - Contract Clauses.

(3) Part 2 - General Requirements.

(4) Part 3 - Project Program Requirements.

(5) Part 6 - Attachments (excluding Concept Drawings).

(6) Part 5 - Prescriptive Specifications exclusive of performance specifications.

(7) Part 4 - Performance Specifications exclusive of prescriptive specifications.

(8) Part 6 - Attachments (Concept Drawings).

3.3.2.1 Government Review or Approval

Government review or approval of any portion of the proposal or final design shall not relieve the Contractor from responsibility for errors or omissions with respect thereto.

-- End of Section --

SUBMITTAL REGISTER

CONTRACT NO.
11P1267

TITLE AND LOCATION
MESS HALL - FRENCH CREEK

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAG # RAPH	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 14 00.05 20	SD-01 Preconstruction Submittals															
			List of contact personnel	1.3.1.1	G													
		01 20 00.05 20	SD-01 Preconstruction Submittals															
			Schedule of prices	1.3	G													
		01 31 19.05 20	SD-01 Preconstruction Submittals															
			Project Schedule	1.7	G													
			Performance Assessment Plan	1.6	G													
			(PAP)															
			CDW Facilitator Experience	1.5.2.1	G													
			Resume															
			CDW Preliminary Concept	1.5.3.1	G													
			Design															
			CDW Basis of Design with Cost	1.5.3.2	G													
			Estimate															
			CDW Concept Design Report	1.5.2.4	G													
		01 32 17.05 20	SD-01 Preconstruction Submittals															
			Qualifications	1.5	G													
			Design Baseline Network	1.3	G													
			Analysis Schedule (NAS)															
			Construction Baseline Network	1.3	G													
			Analysis Schedule (NAS)															
			SD-07 Certificates															
			Monthly Network Analysis	1.7.1	G													
			Schedule Updates															
			Three-Week Look Ahead	1.10	G													
			Schedule															

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(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 32 17.05 20	SD-11 Closeout Submittals															
			As-Built Schedule	1.7.2	G													
		01 33 00.05 20	SD-01 Preconstruction Submittals															
			Submittal Register Format	1.3.1	G													
			Submittal Register	1.4.7	G													
		01 33 10.05 20	SD-01 Preconstruction Submittals															
			Consolidated RFP Documents	2.1	G													
			Submittal Register	1.7.3	G													
			SD-04 Samples															
			Final framed rendering	1.9.1	G													
			SD-05 Design Data															
			Design Drawings	1.6	G													
			Specifications	1.7	G													
			Design Analysis	1.8	G													
			DD Form 1354	1.11.4	G													
			Design Submittals	2.2	G													
			Sustainable Design	1.8	G													
			Project Rendering	1.9	G													
			Facility Recognition Plaque	1.10	G													
			SD-07 Certificates															
			LEED Green Building Rating	1.8.3.1	G													
			System (GBRS)															
			LEED Certification Registration	1.8.3.1	G													
			Application															
			LEED Certification	1.8.3.1	G													
			SD-11 Closeout Submittals															

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TITLE AND LOCATION: MESS HALL - FRENCH CREEK

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(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 33 10.05 20	Record Documents	1.11	G													
			NAVFAC Sustainable and Energy	1.11.3	G													
			Data Record Card															
			DD Form 1354	1.11.4	G													
		01 35 26	SD-01 Preconstruction Submittals															
			Accident Prevention Plan (APP)	1.7	G	A												
			Activity Hazard Analysis (AHA)	1.8	G	A												
			Crane Critical Lift Plan	1.7.1	G	A												
			Crane Operators	1.6.1.3	G	A												
			SD-06 Test Reports															
			Reports	1.12														
			Accident Reports	1.12.1														
			Monthly Exposure Reports	1.12.3														
			Crane Reports	1.12.4														
			Arc Flash Risk/Hazard Analysis	3.9.2	G													
			SD-07 Certificates															
			Confined Space Entry Permit	1.9														
			Hot work permit	1.9														
			Arc Flash Risk/Hazard Analysis	3.9.3	G													
			Qualifications															
			Contractor Electrical Energized	3.9.4	G													
			Work Permit															
			Contractor Safety Self-Evaluation	1.4	G	A												
			Checklist															
			Certificate of Compliance	1.12.5														
		01 45 00.05 20	SD-01 Preconstruction Submittals															

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							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 45 00.05 20	Design Quality Control (DQC)	1.3.1	G													
			Plan															
			Construction Quality Control	1.3.1	G													
			(CQC) Plan															
			Commissioning Plan	1.3.2	G													
			SD-06 Test Reports															
			Acceptance Testing of Critical	1.3.2														
			Systems Checklist															
			SD-07 Certificates															
			Preliminary Inspections and Final	1.4.3.1	G													
			Acceptance Testing															
			Final Life Safety/Fire Protection	1.4.3.1	G													
			Certification															
			IBC Special Inspections	1.4.3.3	G													
			Certification															
			SD-11 Closeout Submittals															
			Summary Commissioning Report	1.3.3														
			Training Course Outline	1.7	G													
			Training Video Recording	1.7	G													
		01 50 00.05 20	SD-01 Preconstruction Submittals															
			Traffic control plan	1.8.1	G													
			SD-06 Test Reports															
			Backflow Preventer Tests	3.3	G													
			SD-07 Certificates															
			Backflow Tester	1.6	G													
			Backflow Preventers	1.4														

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ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 57 19.00 20	SD-01 Preconstruction Submittals															
			Preconstruction Survey	1.5.1	G													
			Solid Waste Management Plan	3.4	G													
			and Permit															
			Regulatory Notifications	1.5.2	G													
			Environmental Management Plan	3.1	G													
			Storm Water Pollution Prevention	3.2.2.1	G													
			Plan															
			Air Emissions Source	3.2.5	G													
			Specification Data															
			Dirt and Dust Control Plan	3.14.1														
			Contractor Hazardous Material	3.6	G													
			Inventory Log															
			SD-06 Test Reports															
			Laboratory Analysis	3.13.2.2														
			Erosion and Sediment Control	3.2.2														
			Inspection Reports															
			Storm Water Inspection Reports	3.2.2														
			for General Permit															
			Contractor 40 CFR employee	1.5.5														
			training records															
			Solid Waste Management Report	3.4.1	G													
			SD-11 Closeout Submittals															
			Storm Water Pollution Prevention	3.2.2.2	G													
			Plan compliance notebook															

SUBMITTAL REGISTER

CONTRACT NO. 11P1267

TITLE AND LOCATION: MESS HALL - FRENCH CREEK

CONTRACTOR:

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAG # RAPH	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY					REMARKS
							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 57 19.00 20	Waste Determination	3.5														
			Documentation															
			Disposal Documentation for	3.6.1														
			Hazardous and Regulated Waste															
			Contractor 40 CFR Employee	1.5.5														
			Training Records															
			Solid Waste Management Permit	3.4														
			Solid Waste Management Report	3.4.1														
			Contractor Hazardous Material	3.6	G													
			Inventory Log															
			Hazardous Waste/Debris	3.13.2														
			Management															
			Regulatory Notifications	1.5.2														
		01 78 24.05 20	SD-06 Test Reports															
			Validation Site Visit and	3.1	G													
			Presentation															
			SD-11 Closeout Submittals															
			Preliminary Submittal	1.4.1	G													
			Prefinal Submittal	1.4.2	G													
			Final Submittal	1.4.3	G													
		01 78 30.00 22	SD-11 Closeout Submittals															
			GIS data deliverables	1.3.2.3	G													
		27 10 00	SD-02 Shop Drawings															
			Telecommunications drawings	1.6.1	G													
			Distribution frames	1.6.2	G													
			SD-03 Product Data															

SUBMITTAL REGISTER

CONTRACT NO. 11P1267

TITLE AND LOCATION: MESS HALL - FRENCH CREEK

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY					REMARKS
							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		27 10 00	Telecommunications cabling	2.3.1	G													
			Patch panels	2.4.4	G													
			Telecommunications	2.6	G													
			outlet/connector assemblies															
			Equipment support frame	2.4.1	G													
			Connector blocks	2.4.3	G													
			Protector modules	2.4.2.1	G													
			SD-06 Test Reports															
			Telecommunications cabling	3.3.1	G													
			testing															
			Factory reel tests	3.3.1.2	G													
			SD-07 Certificates															
			Telecommunications Contractor	1.6.3.1	G													
			Manufacturer Qualifications	1.6.3.2	G													
			Test plan	1.6.4	G													
			SD-10 Operation and Maintenance															
			Data															
			Telecommunications cabling and	1.6.5	G													
			pathway system															
		33 82 00	SD-02 Shop Drawings															
			Telecommunications Outside	1.6.1.1	G													
			Plant															
			Telecommunications Entrance	1.6.1.2	G													
			Facility Drawings															
			SD-03 Product Data															
			Wire and cable	2.8	G													

SUBMITTAL REGISTER

CONTRACT NO. 11P1267

TITLE AND LOCATION: MESS HALL - FRENCH CREEK

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY					REMARKS
							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		33 82 00	Cable splices, and connectors	2.5	G													
			Closures	2.3	G													
			Building protector assemblies	2.2.1	G													
			Protector modules	2.2.2	G													
			Cross-connect terminal cabinets	2.4	G													
			Spare Parts	1.8.2	G													
			SD-06 Test Reports															
			Pre-installation tests	3.5.1	G													
			Acceptance tests	3.5.2	G													
			Outside Plant Test Plan	1.6.3	G													
			SD-07 Certificates															
			Telecommunications Contractor	1.6.2.1	G													
			Key Personnel	1.6.2.2	G													
			Manufacturer's Qualifications	1.6.2.3	G													
			SD-08 Manufacturer’s Instructions															
			Building protector assembly	2.2.1	G													
			installation															
			Cable tensions	3.1.8.1	G													
			Fiber Optic Splices	3.1.10.2	G													
			SD-09 Manufacturer’s Field															
			Reports															
			Factory Reel Test Data	2.16.1	G													
			SD-10 Operation and Maintenance															
			Data															
			Telecommunications outside	1.6.1.1	G													
			plant (OSP)															

SUBMITTAL REGISTER

CONTRACT NO.
11P1267

TITLE AND LOCATION
MESS HALL - FRENCH CREEK

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAG # RAPH	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY					REMARKS
							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		33 82 00	SD-11 Closeout Submittals															
			Record Documentation	1.8.1	G													

TITLE: MESS HALL - FRENCH CREEK - MCB CAMP LEJEUNE, NC (11P1267)

TRANSFER AND ACCEPTANCE OF MILITARY REAL PROPERTY

Form Approved
OMB No. 0704-0188

The public reporting burden for the collection of information is estimated to average 30 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to the Department of Defense, Executive Services and Communications Directorate (0704-0188). Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

PLEASE DO NOT RETURN YOUR COMPLETED FORM TO THE ABOVE ORGANIZATION

1. FROM (Installation/Activity/District and ZIP Code)	2. DATE PREPARED (YYYYMMDD)	3. PROJECT/JOB NUMBER	4. SERIAL NUMBER	9. TRANSACTION DETAILS
	20100414	11P1267		a. ☑ NEW CONST. ☐ EXISTING FAC. ☐ CAPITAL IMP. ☐ OTHER (Specify)
5. TO (Installation/Activity/Service, ZIP Code & INSNO) COMMANDING GENERAL ATTN: PUBLIC WORKS DIVISION MARINE CORPS BASE PSC BOX 20004 CAMP LEJEUNE, NC 28542-0004	6. SITE/INSN0/ NAME M67001	7. CONTRACT NUMBER(S)	8. DRAWING NUMBER(S)	b. ☐ PHYS. COM. AVAIL. ☐ BENF/O ☐ PARTIAL BOD ☐ FINANCIAL COM. ☐ OTHER (Specify)
				c. ☑ DRAFT ☐ FINAL ☐ INTERIM
				d. EFFECTIVE DATE (YYYYMMDD)

10. ITEM NO.	11. FACILITY NO.	12. CATEGORY CODE	13. CATCODE DESCRIPTION	14. TYPE	AREA 15. UNIT OF MEAS 1	AREA 16. TOTAL QUANTITY UM 1	OTHER 17. UNIT OF MEAS 2	OTHER 18. TOTAL QUANTITY UM2	19. COST	20. FUND SOURCE	21. FUND ORG	22. INTER-EST CODE	23. ITEM REMARKS
1		13510	COMMUNICATION-LINES - OTHER THAN TELEPHONE		MI		EA						
2	UN640	13520	TELEPHONE LINES		MI		EA						
3		72210	ENLISTED DINING FACILITY		PN		SF						
4		75022	GREENWAY TRAIL		EA		MI						
5		75057	CONCRETE OUTDOOR DINING AREA		EA								
6													
7													

a. TRANSFERRED BY (Typed Name and Signature)	d. DATE SIGNED (YYYYMMDD)	25.a. ACCEPTED BY (Typed Name and Signature)	b. DATE SIGNED (YYYYMMDD)
c. TITLE (Area Engr./Base Engr./DPW)		c. TITLE (DPW/RPAO)	26. PROPERTY VOUCHER NUMBER

27. CONSTRUCTION DEFICIENCIES (attach blank sheet for continuations)

THIRD MEASUREMENT =

NOTE: THE ATTACHED SUPPORT FACILITY NUMBERS AND CATCODES ARE NOT ALL INCLUSIVE. THEY ARE LISTED HERE AS A COURTESY ONLY.

28. PROJECT REMARKS (attach blank sheet for continuation)

Height: Width: Length: Regular:

S & A Cost:
Construction Cost:
Subtotal:
Equipment Cost:
Total Project Cost:

DD 1354 Prepared by

INSTRUCTIONS

GENERAL. This form has been designed and issued for use in connection with the transfer of military real property between the military departments and to or from other government agencies. It supersedes ENG Forms 290 and 290B (formerly used by the Army and Air Force) and NAVDOCKS Form 2317 (formerly used by the Navy).

Existing instructions issued by the military departments relative the the preparation of DD Form 1354 are applicable to this revised form to the extent that the various items and columns on the superseded forms have been retained. The military departments may promulgate additional instructions, as appropriate.

For detailed instructions on how to fill out this form, please refer to Unified Facilities Criteria (UFC) 1-300-08, dated 17 December 2003.

SPECIFIC DATA ITEMS.

1. From. Name and address of the transferring agency.

2. Date Prepared. Date of actual preparation. Enter all dates in YYYYMMDD format (Example: March 31, 2004 = 20040331).

3. Project/Job Number. Project number on a DD Form 1354 or Individual Job Order Number.

4. Serial Number. Sequential serial number assigned by the preparing organization. (e.g., 2004-0001).

5. To. Name and address of the receiving installation, activity, and service of the Real Property Accountable Officer (RPAO).

6. Site/INSNO and Name. Site or installation number and site name where the constructed facility is located.

7. Construct Number(s). Contract number(s) for this project.

8. Drawing Number(s). Drawing number(s) or CAD identifier(s) for project components.

9. Transaction Details.

a. Type of Transaction. Mark (X) only one box.

b. When/Event. When or event causing preparation of DD Form 1354. X only one box.

c. Version, Draft, Interim, or Final DD Form 1354. X only one box.

d. Effective Date. Effective date for transaction; start date of depreciation.

10. Item Number. Use a separate item number for each facility, no item number for additional usages.

11. Facility Number. Unique facility number identified in Real Property Inventory.

12. Category Code. The category code describes the facility usage.

13. Catcode Description. The category code name which describes the facility usage.

14. Type. Type of construction. **P** for Permanent; **S** for Semipermanent; **T** for Temporary

15. Area: Unit of Meas 1. Area unit of measure; use SF, SY, AC only

16. Total Quantity UM 1. The total area for the measure identified in Item 15. Use negative numbers for demolition.

17. Other: Unit of Meas 2. Unit of Measure 2 is the capacity or other measurement unit (e.g., LF, MB, EA, etc..).

18. Total Quantity UM 2. The total capacity/other for the measure identified in Item 17.

19. Cost. Cost for each facility; for capital improvements to existing facilities, show amount of increase only.

20. Fund Source. Enter the Fund Source Code for this item, i.e., 01-MILCON, 02-BRAC, 03-O&M, etc.

21. Funding Organization. Enter the code for the organization responsible for replacing this facility at the end of its useful life, i.e., 00-Army Active, 01-Army Reserve, 02-Army National Guard, etc.

22. Interest Code. Enter the code that reflects government interest or ownership in the facility, i.e., 01-Owned by DoD, 02-Owned by Federal Government (non-DoD), etc.

23. Item Remarks. Remarks pertaining only to the item number identified in Item 10; show cost sharing.

24. Statement of Completion. Typed name, signature, title, and date of signature by the responsible transferring individual or agent.

25. Accepted By. Typed name, signature, title, and date of signature by the RPAO or accepting official.

26. Property Voucher Number. Next sequential number assigned by the RPAO in voucher register.

27. Construction Deficiencies. List construction deficiencies in project during contractor turnover inspection.

28. Project Remarks. Project level remarks, continuation of blocks, and used to explain "other" entries in Item 9.

TITLE: MESS HALL - FRENCH CREEK - MCB CAMP LEJEUNE, NC (11P1267)

					AREA		OTHER						
10. ITEM NO.	11. FACILITY NO.	12. CATEGORY CODE	13. CATCODE DESCRIPTION	14. TYPE	15. UNIT OF MEAS 1	16. TOTAL QUANTITY UM 1	17. UNIT OF MEAS 2	18. TOTAL QUANTITY UM2	19. COST	20. FUND SOURCE	21. FUND ORG	22. INTER-EST CODE	23. ITEM REMARKS
8		81232	UNDERGROUND ELECTRICAL DISTRIBUTION LINES				LF						
9	UN680	81240	AREA LIGHTING		LF		EA						
10		81160	STAND-BY GENERATOR PLANT (EXCLUDE NO-BREAK UNITS)		EA								
11		81220	STREET LIGHTING		LF								
12	UN660	81231	OVERHEAD ELECTRICAL DISTRIBUTION LINES		LF								
13	STMHTFC	82222	UNDERGROUND STEAM DISTRIBUTION LINE		LF								
14	STMHTFC	82224	UNDERGROUND STEAM CONDENSATE LINE		LF								
15	UN520	82410	NATURAL GAS LINE		LF								
16		83116	OIL/WATER SEPARATOR/GRIT CHAMBER		KG								
17	UN240	83210	SANITARY SEWER BASE				LF						
18	UN241	83210	SANITARY SEWER SITE				LF						
19		83230	PUMP LIFT STATION		GM								
20		83330	DUMPSTER PADS AND SCREEN WALL		EA		SY						
21													
22	UN1043	84120	WATER DISTRIBUTION SUPPLY MAIN POTABLE				LF						
23	UN910	84210	WATER DISTRIBUTION LINE POTABLE SITE				LF						

TYPICAL SUPPORT FACILITY NUMBERS AND CATEGORY CODES

					AREA		OTHER						
10. ITEM NO.	11. FACILITY NO.	12. CATEGORY CODE	13. CATCODE DESCRIPTION	14. TYPE	15. UNIT OF MEAS 1	16. TOTAL QUANTITY UM 1	17. UNIT OF MEAS 2	18. TOTAL QUANTITY UM2	19. COST	20. FUND SOURCE	21. FUND ORG	22. INTER-EST CODE	23. ITEM REMARKS
24	UN1387	84310	FIRE PROTECTION PIPELINE				LF						
25													
26		84450	STORM WATER POND										
27		84472	FIRE PUMP W/DIESEL BACKUP										
28	UN270	85110	ROADS/CONCRETE		SY		MI						
29	UN1045	85110	ROADS/BIT		SY		MI						
30	UN280	85110	ROADWAY INTERSECTION IMPROVEMENT		SY		MI						
31		85120	BRIDGE OVER COGDELL'S CREEK		SY		LF						
32	UN340	85210	PARKING AREA/CONCRETE		SY								
33	UN350	85210	PARKING AREA/BIT		SY								
34	UN380	85220	SIDEWALK/PAVED		SY								
35	UN390	85220	SIDEWALK/UNPAVED		SY								
36		85235	GENERATOR PAD		SY								

TYPICAL SUPPORT FACILITY NUMBERS AND CATEGORY CODES

					AREA		OTHER						
10. ITEM NO.	11. FACILITY NO.	12. CATEGORY CODE	13. CATCODE DESCRIPTION	14. TYPE	15. UNIT OF MEAS 1	16. TOTAL QUANTITY UM 1	17. UNIT OF MEAS 2	18. TOTAL QUANTITY UM2	19. COST	20. FUND SOURCE	21. FUND ORG	22. INTER-EST CODE	23. ITEM REMARKS
37	UN470	87110	STORM SEWERS		LF								
38	UN480	87120	DRAINAGE DITCH		LF								
39		88010	FIRE-ALARM SYSTEM		EA								
40													
41													
42													
43													
44													
45													
46													
47													
48													
49													
50													
51													
52													

DD Form 1354 Addendum

CLASS 2 PROPERTY RECORD DATA

ACTIVITY UIC: _____DD Form 1354, Item 6
ACTIVITY NAME: _____DD Form 1354, Item 5
SPEC AREA_____
PR NO _____
FACILITY NO: _____DD Form 1354, Item 11

LOCATION GENERAL INFO
COUNTRY: iNFADS fills this based on UIC and Special Area
RPTG-CLMT-UIC _____
ACTION TYPE _____(Acquisition, Capital Improvement, Disposal)
STATE: iNFADS fills this based on UIC and Special Area
COUNTY: iNFADS fills this based on UIC and Special Area
CITY: iNFADS fills this based on UIC and Special Area
FACILITY NAME: _____Completed by gaining installation
MAP GRID: _____Completed by gaining installation
FORMER ACTIVITY UIC: _____DD Form 1354, Item 1, Transfer only
FORMER PR NO.: _____Transfers within Dept of Navy only
FACILITY TYPE: _____Determined by Prime Use Category Code
FAMILY HOUSING INDICATOR: _____ Y/N

MEASUREMENTS
LENGTH_____
WIDTH_____
HEIGHT_____
DEPTH_____
AREA/UM_____
STORIES_____
IRREGULAR_____(Y or N)
ATTIC____ (Y or N)
BASEMENT____(Y or N)
MEZZANINE___(Y or N)
PENTHOUSE____(Y or N)

CONSTRUCTION
YEAR BUILT_____ (New Construction)
YEAR IMPROVED _____ (Capital Improvement)
CURR PROJ NO_____ (Capital Improvement)

DD Form 1354 Addendum

ORIG PROJ NO_____ (New Construction)
CONSTRUCTION TYPE_____(P, S, T, or R)
HERITAGE ASSET DATA –_____ Transfers only

MAINTENANCE
PRIME USE CAT CODE_____ (Largest Category Code for facility on DD Form 1354, Item 12)
MAINT FUND CODE_____ (Supplied by gaining installation)
MAINT RESP_____ (Supplied by gaining installation)
COST REF DOCUMENT NUMBERS: _____DD Form 1354, Item 7

EXCESS / DISPOSAL (DISPOSAL DD FORM 1354 ONLY)
EXCESS ACTION CODE_____
EXCESS ACTION DATE_____
DISPOSAL METHOD_____
DISPOSAL DATE_____
EFD DISPOSAL CONTRACT_____
GSA DISPOSAL CONTRACT_____
DISP CONSOL PR_____

STATUS / UTILIZATION
USER UIC/OG ID_____ (Supplied by gaining installation)
CATEGORY CODE_____ DD Form 1354, Item 12
USE_____(Optional)
AREA/UM_____ DD Form 1354, Items 15 and 16
OTHER/UM_____ DD Form 1354, Items 17 and 18
ALT/UM _____ Must be put in Remarks section of DD Form 1354, where applicable.

SECTION 01 33 29

LEED(TM) DOCUMENTATION
06/10

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

FOREST STEWARDSHIP COUNCIL (FSC)

FSC STD 01 001	(2000) Principles and Criteria for Forest Stewardship

U.S. GREEN BUILDING COUNCIL (USGBC)

LEED	(2002; R 2005) Leadership in Energy and Environmental Design(tm) Green Building Rating System for New Construction (LEED-NC)
LEED Reference Guide	(2007) LEED-NC Reference Guide for New Construction

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

LEED Implementation Plan; G

SD-11 Closeout Submittals

LEED Documentation Notebook; G

1.3 DESCRIPTION

This project has been designed for, and shall be developed for a sustainable rating of gold in accordance with LEED Version 3.0. Table 1 (see paragraph Table) identifies the LEED credit items that are designed into or otherwise required for this project. No variations or substitutions to the LEED credits identified for this contract shall be allowed without written consent from the Contracting Officer. Should there be a case where there is any problem meeting the full requirements of a LEED credit identified for this project in Table 1, the Contractor must bring this to the attention of the Contracting Officer immediately.

1.3.1 Credit Validation

This project will be registered with USGBC for validation of credits

earned. Contractor is not responsible for registering the project with USGBC or for paying project registration fees to USGBC. Format and content of all construction documentation must be in accordance with the LEED Reference Guide requirements for supporting data required in event of USGBC audit of the particular credit. Contractor is required to coordinate through the Contracting Officer with Government's Administrative Assistant on assuring assembled data is acceptable to USGBC and responding to USGBC requests for additional construction data in the course of seeking project certification. Design documentation will be provided by others.

1.3.2 Contractor Responsibilities

Some LEED credits are inherent in the design provided and require no further submittal or documentation. For these credits, the Contractor notify the Contracting Officer in advance of selection of any specified material or use of any permissible construction methods that may result in a deviation from the LEED designer intent. Some LEED credits involve material selection and are generally identified within the technical sections with the notation "LEED," though not specifically identified in all occurrences. Some LEED credits are dependent on construction practices.

All LEED credits identified in Table 1 not inherent in the design provided shall be documented by the Contractor. Table 1 provides a general summary of applicable credits. Detailed submittal requirements are contained in the LEED Reference Guide and in the technical sections.

In all cases where a material, product, or execution requirement is identified by "LEED" in the contract documents, additional data or certificates shall be submitted with the individual component or process validating the material or component to the respective LEED credit item. These additional data or certificates shall be separable from the other submitted data and a copy shall be included in the LEED Documentation Notebook in addition to the distribution indicated in the submittal register.

1.4 LEED IMPLEMENTATION PLAN

LEED Implementation Plan shall be submitted within 30 days after notice to proceed. The plan, when completed, shall provide a detailed description of all activities that relate to accomplishing project LEED requirements, including construction practices, procurement practices, and proposed submittals and documentation for each LEED credit. Plan shall also include the following:

a. Name of individual on the Contractor's staff responsible for ensuring LEED credits and prerequisites are earned and responsible for assembling documentation. A responsible LEED Accredited Professional shall be identified.

b. Copy of proposed contract with Commissioning Agent.

c. Templates to be used for tracking LEED credits. Listing of documents to be provided for each credit and schedule for their inclusion in LEED Documentation Notebook. Include proposed materials, associated estimated costs, and details necessary for LEED calculations in order to determine if the listed materials can be expected to achieve the project goal.

d. List of all plans required in the technical sections for LEED credit.

Proposed submittal date ofr each plan. These shall be added to the LEED Implementation Plan as they are completed.

e. Implementation plan for cumulative materials credits, which shall use applicable template with proposed materials, associated estimated costs, and details necessary for LEED Calculations added in order to determine if the listed materials can be expected to achieve the project goal. Submit cumulative materials implementation plans before materials purchaing begins.

1.5 LEED DOCUMENTATION NOTEBOOK

The Contractor shall prepare a comprehensive notebook documenting compliance for each LEED credit identified in Table 1. LEED Documentation Notebook shall be formatted to match LEED numbering system and tabbed for each credit and prerequisite. LEED documentation in notebook shall contain up to date information through the previous month's work, and at least one set shall be available on the jobsite at all times. The Notebook may be maintained and available for reference electronically if preferred. Completed pages shall be prevented from being altered. If the Contractor fails to maintain the LEED Documentation Notebook as specified herein, the Contracting Officer will deduct from the monthly progress payment an amount representing the estimated cost of maintaining the Notebook. This monthly deduction will continue until an agreement can be reached between the Contracting Officer and the Contractor regarding the accuracy and completeness of the Notebook. The original, one copy, and an electronic version on CD of the notebook shall be submitted at project closeout.

1.5.1 Content

Notebook shall include Table 1, applicable product data for material selection, final calculations, certifications for construction practices, procurement data, cumulative calculations and other items as identified in the approved LEED Implementation Plan. Notebook must contain all required data to support full compliance with the indicated LEED credit. LEED credits that are inherent to the design will be documented by the designer of record.

1.5.2 LEED Calculations

Calculations showing compliance with a required LEED credit identified in Table 1 or within the LEED Implementation Plan. Calculations shall be current and available for monthly review. Final calculations shall be included in the LEED Documentation Notebook under the appropriate tab.

1.5.3 Submittals

All "G" designated submittals required for inclusion in the LEED Documentation Notebook shall be separable from other submitted data and shall be included in the LEED Documentation Notebook in addition to the distribution indicated on the submittal register.

1.6 REQUIREMENTS

LEED credits as identified in Table 1 shall be incorporated and documented as required by the Contract documents and in full compliance with the LEED Reference Guide. LEED credits not identified elsewhere in the Contract documents and those requiring further instruction are specified below. Refer to the LEED Reference Guide for further definitions and

requirements.

1.6.1 Materials and Resources Credit 4, Recycled Content

Not withstanding the requirements of Section 01 62 35 RECYCLED/RECOVERED MATERIALS, Contractor shall select materials so that the sum of post-consumer recycled content value plus one-half of post-industrial recycled content value constitutes at least 20 percent of the total materials cost for the project. EPA Comprehensive Procurement Guidelines has a supplier database. California Integrated Waste Management Board (CIWMB) Recycled Content Directory also contains product and supplier data at www.ciwmb.ca.gov/rcp.

1.6.1.1 Calculations

LEED Letter Template forms shall be used for tracking and documentation. Recycled content value of project materials shall be determined by the method described in the LEED Reference Guide.

1.6.1.2 Substitutions

In the case of conflict between this requirement and individual technical section requirements, Contractor may submit for Government approval proposed alternative products or systems that provide equivalent performance and appearance and have greater contribution to project recycled content requirements. All such proposed substitutions shall be submitted with the LEED Implementation Plan accompanied by product data that demonstrates equivalence.

1.6.2 Materials and Resources Credit 5, Regional Materials

Contractor shall select materials so that a minimum of 20 percent (by dollar value) of materials and products for the project are extracted, harvested, or recovered, as well as manufactured, regionally within a 500 mile radius of the project site.]

1.6.2.1 Calculations

LEED Letter Template forms shall be used for tracking and documentation. Amount of regional project materials shall be determined by the method described in the LEED Reference Guide.

1.6.3 Materials and Resources Credit 7, Certified Wood

Contractor shall select materials so that a minimum of 50 percent (by dollar value) of permanently installed wood-based materials and products for the project are certified in accordance with FSC STD 01 001.

1.6.3.1 Calculations

LEED Letter Template forms shall be used for tracking and documentation. Amount of FSC-certified project materials shall be determined by the method described in the LEED Reference Guide.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 COORDINATION MEETINGS

There will be three onsite coordination meetings. The first will be a preconstruction meeting to review the LEED Implementation Plan. The requirements for this meeting may be fulfilled during the coordination and mutual understanding meeting outlined in Section 01 45 02 NAVFAC QUALITY CONTROL. The second will be a pre-closeout meeting to review LEED Documentation Notebook for completeness and identify any outstanding issues relating to final score and documentation requirements. The third is a closeout meeting to review the final LEED Documentation Notebook. All meetings shall be attended by Contractor's designated individual responsible for LEED documentation, Government representative and Installation representative. At closeout meeting a final score for the project will be determined based on review of project performance and documentation. Contractor shall make a set of contract drawings and specifications available for review at each meeting as well as an updated LEED Documentation Notebook.

3.2 TABLE

LEED credits as identified in Table 1 below are contract requirements and shall be incorporated in full compliance with the LEED Reference Guide.

-- End of Section --

LEED V2.2 for New Construction and Major Renovation

Project Checklist

CDC

June 17, 2010

Sustainable Sites — Possible Points: 14

Y	N	?			
9	2	3		Sustainable Sites	Possible Points: 14
Y			Prereq 1	Construction Activity Pollution Prevention	
		1	Credit 1	Site Selection	1
		1	Credit 2	Development Density and Community Connectivity	1
		1	Credit 3	Brownfield Redevelopment	1
	1		Credit 4.1	Alternative Transportation—Public Transportation Access	1
1			Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	1
1			Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicles	1
1			Credit 4.4	Alternative Transportation—Parking Capacity	1
	1		Credit 5.1	Site Development—Protect or Restore Habitat	1
1			Credit 5.2	Site Development—Maximize Open Space	1
1			Credit 6.1	Stormwater Design—Quantity Control	1
1			Credit 6.2	Stormwater Design—Quality Control	1
1			Credit 7.1	Heat Island Effect—Non-roof	1
1			Credit 7.2	Heat Island Effect—Roof	1
1			Credit 8	Light Pollution Reduction	1

Water Efficiency — Possible Points: 5

Y	N	?			
5				Water Efficiency	Possible Points: 5
2			Credit 1	Water Efficient Landscaping	2
1			Credit 2	Innovative Wastewater Technologies	1
2			Credit 3	Water Use Reduction	2

Energy and Atmosphere — Possible Points: 17

Y	N	?			
4	1	12		Energy and Atmosphere	Possible Points: 17
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	
Y			Prereq 3	Fundamental Refrigerant Management	
3		7	Credit 1	Optimize Energy Performance	10
	1	2	Credit 2	On-Site Renewable Energy	3
		1	Credit 3	Enhanced Commissioning	1
1			Credit 4	Enhanced Refrigerant Management	1
		1	Credit 5	Measurement and Verification	1
		1	Credit 6	Green Power	1

Materials and Resources — Possible Points: 13

Y	N	?			
7		6		Materials and Resources	Possible Points: 13
Y			Prereq 1	Storage and Collection of Recyclables	
		2	Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	2
		1	Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements	1
2			Credit 2	Construction Waste Management	2
		2	Credit 3	Materials Reuse	2

Materials and Resources, Continued

Y	N	?			
2			Credit 4	Recycled Content	2
2			Credit 5	Regional Materials	2
		1	Credit 6	Rapidly Renewable Materials	1
1			Credit 7	Certified Wood	1

Indoor Environmental Quality — Possible Points: 15

Y	N	?			
13	2			Indoor Environmental Quality	Possible Points: 15
Y			Prereq 1	Minimum Indoor Air Quality Performance	
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	
1			Credit 1	Outdoor Air Delivery Monitoring	1
	1		Credit 2	Increased Ventilation	1
1			Credit 3.1	Construction IAQ Management Plan—During Construction	1
1			Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
1			Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
1			Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
1			Credit 4.3	Low-Emitting Materials—Carpet Systems	1
1			Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
1			Credit 5	Indoor Chemical and Pollutant Source Control	1
1			Credit 6.1	Controllability of Systems—Lighting	1
1			Credit 6.2	Controllability of Systems—Thermal Comfort	1
	1		Credit 7.1	Thermal Comfort—Design	1
1			Credit 7.2	Thermal Comfort—Verification	1
1			Credit 8.1	Daylight and Views—Daylight	1
1			Credit 8.2	Daylight and Views—Views	1

Innovation and Design Process — Possible Points: 5

Y	N	?			
1	4			Innovation and Design Process	Possible Points: 5
	1		Credit 1.1	Innovation in Design: Specific Title	1
	1		Credit 1.2	Innovation in Design: Specific Title	1
	1		Credit 1.3	Innovation in Design: Specific Title	1
	1		Credit 1.4	Innovation in Design: Specific Title	1
1			Credit 2	LEED Accredited Professional	1

Total — Possible Points: 69

Y	N	?			
39	9	21		Total	Possible Points: 69

Certified 26 points Silver 33 points Gold 39 points Platinum 52 points

SECTION 01 35 26

GOVERNMENTAL SAFETY REQUIREMENTS
02/10

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) / INTERNATIONAL SAFETY EQUIPMENT ASSOCIATION (ISEA)

ANSI/ISEA 107	(2004) High-Visibility Safety Apparel and Headwear

AMERICAN SOCIETY OF SAFETY ENGINEERS (ASSE/SAFE)

ASSE/SAFE A10.32	(2004) Fall Protection
ASSE/SAFE A10.34	(2001; R 2005) Protection of the Public on or Adjacent to Construction Sites
ASSE/SAFE Z359.1	(2007) Safety Requirements for Personal Fall Arrest Systems, Subsystems and Components
ASSE/SAFE Z87.1	(2003) Standard for Occupational and Educational Eye and Face Protection

ASME INTERNATIONAL (ASME)

ASME B30.22	(2005) Articulating Boom Cranes
ASME B30.3	(2009) Construction Tower Cranes
ASME B30.5	(2007) Mobile and Locomotive Cranes
ASME B30.8	(2004) Floating Cranes and Floating Derricks

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE C2	(2007; Errata 2006 & 2007; INT 44-56 2007; INT 47, 49, 50, 52-56 2008; INT 57, 58, 51, 48, 59 2009) National Electrical Safety Code

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 10	(2010) Standard for Portable Fire Extinguishers
NFPA 241	(2009) Standard for Safeguarding Construction,Alteration, and Demolition

	Operations
NFPA 51B	(2009) Standard for Fire Prevention During Welding, Cutting, and Other Hot Work
NFPA 70	(2008; AMD 1 2008) National Electrical Code - 2008 Edition
NFPA 70E	(2009; Errata 2009) Standard for Electrical Safety in the Workplace

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2008) Safety and Health Requirements Manual

U.S. DEPARTMENT OF DEFENSE (DOD) UNIFIED FACILITIES CRITERIA (UFC)

UFC 3-560-01	(2008; Change 2) Electrical Safety, O & M

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1910.146	Permit-required Confined Spaces
29 CFR 1915	Confined and Enclosed Spaces and Other Dangerous Atmospheres in Shipyard Employment
29 CFR 1926	Safety and Health Regulations for Construction
29 CFR 1926.500	Fall Protection

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES:

Government acceptance is required for submittals with a "G, A" designation.

SD-01 Preconstruction Submittals

Accident Prevention Plan (APP); G, A

Activity Hazard Analysis (AHA); G, A

Crane Critical Lift Plan; G, A

Proof of qualification for Crane Operators; G, A

SD-06 Test Reports

Reports

Submit reports as their incidence occurs, in accordance with the

requirements of the paragraph entitled, "Reports."

Accident Reports

Monthly Exposure Reports

Crane Reports

Arc Flash Risk/Hazard Analysis; G

SD-07 Certificates

Confined Space Entry Permit

Hot work permit

Arc Flash Risk/Hazard Analysis Qualifications; G

Contractor Electrical Energized Work Permit; G

Contractor Safety Self-Evaluation Checklist; G, A

Certificate of Compliance (Crane)

Submit one copy of each permit/certificate attached to each Daily Quality Control Report.

1.3 DEFINITIONS

a. Competent Person for Fall Protection. A person who is capable of identifying hazardous or dangerous conditions in the personal fall arrest system or any component thereof, as well as their application and use with related equipment, and has the authority to take prompt corrective measures to eliminate the hazards of falling.

b. High Visibility Accident. Any mishap which may generate publicity and/or high visibility.

c. Medical Treatment. Treatment administered by a physician or by registered professional personnel under the standing orders of a physician. Medical treatment does not include first aid treatment even through provided by a physician or registered personnel.

d. Operating Envelope. The area surrounding any crane. Inside this "envelope" is the crane, the operator, riggers and crane walkers, rigging gear between the hook and the load, the load and the crane's supporting structure (ground, rail, etc.).

e. Qualified Person for Fall Protection. A person with a recognized degree or professional certificate, and with extensive knowledge, training and experience in the field of fall protection; who is capable of performing design, analysis, and evaluation of fall protection systems and equipment.

f. Recordable Injuries or Illnesses. Any work-related injury or illness that results in:

(1) Death, regardless of the time between the injury and death, or the length of the illness;

(2) Days away from work (any time lost after day of injury/illness onset);

(3) Restricted work;

(4) Transfer to another job;

(5) Medical treatment beyond first aid;

(6) Loss of consciousness; or

(7) A significant injury or illness diagnosed by a physician or other licensed health care professional, even if it did not result in (1) through (6) above.

g. "USACE" property and equipment specified in USACE EM 385-1-1 should be interpreted as Government property and equipment.

h. Weight Handling Equipment (WHE) Accident. A WHE accident occurs when any one or more of the six elements in the operating envelope fails to perform correctly during operation, including operation during maintenance or testing resulting in personnel injury or death; material or equipment damage; dropped load; derailment; two-blocking; overload; and/or collision, including unplanned contact between the load, crane, and/or other objects. A dropped load, derailment, two-blocking, overload and collision are considered accidents even though no material damage or injury occurs. A component failure (e.g., motor burnout, gear tooth failure, bearing failure) is not considered an accident solely due to material or equipment damage unless the component failure results in damage to other components (e.g., dropped boom, dropped load, roll over, etc.). Any mishap meeting the criteria described above shall be documented in both the Contractor Significant Incident Report (CSIR) and using the NAVFAC prescribed Navy Crane Center (NCC) form submitted within five days both as provided by the Contracting Officer.

1.4 CONTRACTOR SAFETY SELF-EVALUATION CHECKLIST

Contracting Officer will provide a "Contractor Safety Self-Evaluation checklist" to the Contractor at the pre-construction conference. The checklist will be completed monthly by the Contractor and submitted with each request for payment voucher. Additionally, monthly exposure reporting to the Contracting Officer is required to be attached to the monthly billing request. This report is a compilation of employee-hours worked each month for all site workers, both prime and subcontractor. The Contracting Officer will provide copies of any special forms. An acceptable score of 90 or greater is required. Failure to submit the completed safety self-evaluation checklist or achieve a score of at least 90, will result in a retention of up to 10 percent of the voucher.

1.5 REGULATORY REQUIREMENTS

In addition to the detailed requirements included in the provisions of this contract, comply with the most recent edition of USACE EM 385-1-1, Unified Facilities Criteria (UFC) UFC 3-560-01, NFPA 70E, IEEE C2 and federal, state, and local, laws, ordinances, criteria, rules and regulations. Submit matters of interpretation of standards to the appropriate administrative agency for resolution before starting work. Where the

requirements of this specification, applicable laws, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirements govern.

1.6 SITE QUALIFICATIONS, DUTIES AND MEETINGS

1.6.1 Personnel Qualifications

1.6.1.1 Site Safety and Health Officer (SSHO)

Provide a site Safety and Health Officer (SSHO) at the work site at all times to perform safety and occupational health management, surveillance, inspections, and safety enforcement for the Contractor. The Contractor Quality Control (QC) person cannot be the SSHO on this project, even though the QC has safety inspection responsibilities as part of the QC duties. The SSHO shall meet the following requirements:

Level 3:
a. A minimum of 5 years safety work on similar projects.
b. 30-hour OSHA construction safety class or equivalent within the last 5 years.
c. An average of at least 24 hours of formal safety training each year for the past 5 years.
Competent person training as needed.

1.6.1.2 Competent Person for Confined Space Entry

Provide a competent person for confined space meeting the definition and requirements of EM 385-1-1.

1.6.1.3 Crane Operators

Meet the crane operators requirements in USACE EM 385-1-1, Section 16 and Appendix I. In addition, for mobile cranes with Original Equipment Manufacturer (OEM) rated capacitates of 50,000 pounds or greater, designate crane operators as qualified by a source that qualifies crane operators (i.e., union, a government agency, or and organization that tests and qualifies crane operators). Provide proof of current qualification.

1.6.2 Personnel Duties

1.6.2.1 Site Safety and Health Officer (SSHO)

a. Conduct daily safety and health inspections and maintain a written log which includes area/operation inspected, date of inspection, identified hazards, recommended corrective actions, estimated and actual dates of corrections. Attach safety inspection logs to the Contractors' daily quality control report.

b. Conduct mishap investigations and complete required reports. Maintain the OSHA Form 300 and Daily Production reports for prime and sub-contractors.

c. Maintain applicable safety reference material on the job site.

d. Attend the pre-construction conference, pre-work meetings including preparatory inspection meeting, and periodic in-progress meetings.

e. Implement and enforce accepted APPS and AHAs.

f. Maintain a safety and health deficiency tracking system that monitors outstanding deficiencies until resolution. Post a list of unresolved safety and health deficiencies on the safety bulletin board.

g. Ensure sub-contractor compliance with safety and health requirements.

h. Ensure an approved "Contractor Electrical Energized Work Permit" prior to starting any activity on energized electrical systems.

i. Maintain a list of hazardous chemicals on site and their material safety data sheets.

Failure to perform the above duties will result in dismissal of the superintendent, QC Manager, and/or SSHO, and a project work stoppage. The project work stoppage will remain in effect pending approval of a suitable replacement.

1.6.3 Meetings

1.6.3.1 Preconstruction Conference

a. Contractor representatives who have a responsibility or significant role in accident prevention on the project shall attend the preconstruction conference. This includes the project superintendent, site safety and health officer, quality control supervisor, or any other assigned safety and health professionals who participated in the development of the APP (including the Activity Hazard Analyses (AHAs) and special plans, program and procedures associated with it).

b. Discuss the details of the submitted APP to include incorporated plans, programs, procedures and a listing of anticipated AHAs that will be developed and implemented during the performance of the contract. This list of proposed AHAs will be reviewed at the conference and an agreement will be reached between the Contractor and the Contracting Officer's representative as to which phases will require an analysis. In addition, establish a schedule for the preparation, submittal, review, and acceptance of AHAs to preclude project delays.

c. Deficiencies in the submitted APP will be brought to the attention of the Contractor at the preconstruction conference, and the Contractor shall revise the plan to correct deficiencies and re-submit it for acceptance. Do not begin work until there is an accepted APP.

d. The functions of a Preconstruction conference may take place at the Post-Award Kickoff meeting for Design Build Contracts.

1.6.3.2 Safety Meetings

Conduct and document meetings as required by EM 385-1-1. Attach minutes showing contract title, signatures of attendees and a list of topics discussed to the Contractors' daily quality control report.

1.7 ACCIDENT PREVENTION PLAN (APP)

Use a qualified person to prepare the written site-specific APP. Prepare the APP in accordance with the format and requirements of USACE EM 385-1-1 and as supplemented herein. Cover all paragraph and subparagraph elements

in USACE EM 385-1-1, Appendix A, "Minimum Basic Outline for Accident Prevention Plan". Specific requirements for some of the APP elements are described below. The APP shall be job-specific and address any unusual or unique aspects of the project or activity for which it is written. The APP shall interface with the Contractor's overall safety and health program. Include any portions of the Contractor's overall safety and health program referenced in the APP in the applicable APP element and made site-specific. The Government considers the Prime Contractor to be the "controlling authority" for all work site safety and health of the subcontractors. Contractors are responsible for informing their subcontractors of the safety provisions under the terms of the contract and the penalties for noncompliance, coordinating the work to prevent one craft from interfering with or creating hazardous working conditions for other crafts, and inspecting subcontractor operations to ensure that accident prevention responsibilities are being carried out. The APP shall be signed by the person and firm (senior person) preparing the APP, the Contractor, the on-site superintendent, the designated site safety and health officer, the Contractor Quality control Manager, and any designated CSP and/or CIH.

Submit the APP to the Contracting Officer 15 calendar days prior to the date of the preconstruction conference for acceptance. Work cannot proceed without an accepted APP.

Once accepted by the Contracting Officer, the APP and attachments will be enforced as part of the contract. Disregarding the provisions of this contract or the accepted APP will be cause for stopping of work, at the discretion of the Contracting Officer, until the matter has been rectified.

Once work begins, changes to the accepted APP shall be made with the knowledge and concurrence of the Contracting Officer, project superintendent, SSHO and quality control manager. Should any severe hazard exposure, i.e. imminent danger, become evident, stop work in the area, secure the area, and develop a plan to remove the exposure and control the hazard. Notify the Contracting Officer within 24 hours of discovery. Eliminate/remove the hazard. In the interim, take all necessary action to restore and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public (as defined by ASSE/SAFE A10.34,) and the environment.

Copies of the accepted plan will be maintained at the Contracting Officer's office and at the job site. Continuously review and amend the APP, as necessary, throughout the life of the contract. Incorporate unusual or high-hazard activities not identified in the original APP as they are discovered.

1.7.1 EM 385-1-1 Contents

In addition to the requirements outlines in Appendix A of USACE EM 385-1-1, the following is required:

a. Names and qualifications (resumes including education, training, experience and certifications) of all site safety and health personnel designated to perform work on this project to include the designated site safety and health officer and other competent and qualified personnel to be used such as CSPs, CIHs, STSs, CHSTs. Specify the duties of each position.

b. Qualifications of competent and of qualified persons. As a minimum, designate and submit qualifications of competent persons for

each of the following major areas: excavation; scaffolding; fall protection; hazardous energy; confined space; health hazard recognition, evaluation and control of chemical, physical and biological agents; personal protective equipment and clothing to include selection, use and maintenance.

c. Confined Space Entry Plan. Develop a confined and/or enclosed space entry plan in accordance with USACE EM 385-1-1, applicable OSHA standards 29 CFR 1910, 29 CFR 1915, and 29 CFR 1926, OSHA Directive 2.100, and any other federal, state and local regulatory requirements identified in this contract. Identify the qualified person's name and qualifications, training, and experience. Delineate the qualified person's authority to direct work stoppage in the event of hazardous conditions. Include procedure for rescue by contractor personnel and the coordination with emergency responders. (If there is no confined space work, include a statement that no confined space work exists and none will be created.)

d. Crane Critical Lift Plan. Prepare and sign weight handling critical lift plans for lifts over 75 percent of the capacity of the crane or hoist (or lifts over 50 percent of the capacity of a barge mounted mobile crane's hoists) at any radius of lift; lifts involving more than one crane or hoist; lifts of personnel; and lifts involving non-routine rigging or operation, sensitive equipment, or unusual safety risks. Submit 15 calendar days prior to on-site work and include the requirements of USACE EM 385-1-1, paragraph 16.H. and the following:

(1) For lifts of personnel, demonstrate compliance with the requirements of 29 CFR 1926.550(g).

e. Fall Protection and Prevention (FP&P) Program Documentation. The program documentation shall be site specific and address all fall hazards in the work place and during different phases of construction. Address how to protect and prevent workers from falling to lower levels when they are exposed to fall hazards above 6 feet. A qualified person for fall protection shall prepare and sign the program documentation. Include fall protection and prevention systems, equipment and methods employed for every phase of work, responsibilities, assisted rescue, self-rescue and evacuation procedures, training requirements, and monitoring methods. Revise the Fall Protection and Prevention Program documentation every six months for lengthy projects, reflecting any changes during the course of construction due to changes in personnel, equipment, systems or work habits. Keep and maintain the accepted Fall Protection and Prevention Program documentation at the job site for the duration of the project. Include the Fall Protection and Prevention Program documentation in the Accident Prevention Plan (APP).

Site Demolition Plan. The safety and health aspects of DEMOLITION shall be site specific and address all hazards and risks in the work place and during different phases of construction.

g. Excavation Plan. The safety and health aspects of EXCAVATION AND FILL shall be site specific and address all hazards and risks in the work place and during different phases of construction..

1.8 ACTIVITY HAZARD ANALYSIS (AHA)

The Activity Hazard Analysis (AHA) format shall be in accordance with USACE EM 385-1-1. Submit the AHA for review at least 15 calendar days prior to the start of each phase. Format subsequent AHAs as amendments to the APP. The analysis should be used during daily inspections to ensure the implementation and effectiveness of the activity's safety and health controls.

The AHA list will be reviewed periodically (at least monthly) at the Contractor supervisory safety meeting and updated as necessary when procedures, scheduling, or hazards change.

Develop the activity hazard analyses using the project schedule as the basis for the activities performed. Any activities listed on the project schedule will require an AHA. The AHAs will be developed by the contractor, supplier or subcontractor and provided to the prime contractor for submittal to the Contracting Officer.

1.9 DISPLAY OF SAFETY INFORMATION

Within 1 calendar days after commencement of work, erect a safety bulletin board at the job site. Where size, duration, or logistics of project do not facilitate a bulletin board, an alternative method, acceptable to the Contracting Officer, that is accessible and includes all mandatory information for employee and visitor review, shall be deemed as meeting the requirement for a bulletin board. Include and maintain information on safety bulletin board as required by EM 385-1-1, section 01.A.06. Additional items required to be posted include:

a. Confined space entry permit.

b. Hot work permit.

c. Contractor Electrical Energized Work Permit.

1.10 SITE SAFETY REFERENCE MATERIALS

Maintain safety-related references applicable to the project, including those listed in the article "References." Maintain applicable equipment manufacturer's manuals.

1.11 EMERGENCY MEDICAL TREATMENT

Contractors will arrange for their own emergency medical treatment. Government has no responsibility to provide emergency medical treatment.

1.12 REPORTS

1.12.1 Accident Reports

a. Conduct an accident investigation for recordable injuries and illnesses, as defined in 1.3.h and property damage accidents resulting in at least $2,000 in damages, to establish the root cause(s) of the accident, complete the Navy Contractor Significant Incident Report (CSIR) and provide the report to the Contracting Officer within 5 calendar day(s) of the accident. The Contracting Officer will provide copies of any required or special forms.

b. Conduct an accident investigation for any weight handling equipment accident (including rigging gear accidents) to establish the root cause(s) of the accident, complete the WHE Accident Report (Crane and Rigging Gear) form and provide the report to the Contracting Officer within 30 calendar days of the accident. Do not proceed with crane operations until cause is determined and corrective actions have been implemented to the satisfaction of the contracting officer. The Contracting Officer will provide a blank copy of the accident report form.

1.12.2 Accident Notification

Notify the Contracting Officer as soon as practical, but not later than four hours, after any accident meeting the definition of Recordable Injuries or Illnesses or High Visibility Accidents, property damage equal to or greater than $2,000, or any weight handling equipment accident. Within notification include contractor name; contract title; type of contract; name of activity, installation or location where accident occurred; date and time of accident; names of personnel injured; extent of property damage, if any; extent of injury, if known, and brief description of accident (to include type of construction equipment used, PPE used, etc.). Preserve the conditions and evidence on the accident site until the Government investigation team arrives on-site and Government investigation is conducted.

1.12.3 Monthly Exposure Reports

Monthly exposure reporting to the Contracting Officer is required to be attached to the monthly billing request. This report is a compilation of employee-hours worked each month for all site workers, both prime and subcontractor. The Contracting Officer will provide copies of any special forms.

1.12.4 Crane Reports

Submit crane inspection reports required in accordance with USACE EM 385-1-1, Appendix I and as specified herein with Daily Reports of Inspections.

1.12.5 Certificate of Compliance

Provide a Certificate of Compliance for each crane entering an activity under this contract (see Contracting Officer for a blank certificate). State within the certificate that the crane and rigging gear meet applicable OSHA regulations (with the Contractor citing which OSHA regulations are applicable, e.g., cranes used in construction, demolition, or maintenance comply with 29 CFR 1926 and USACE EM 385-1-1 Section 16 and Appendix I. Certify on the Certificate of Compliance that the crane operator(s) is qualified and trained in the operation of the crane to be used. Also certify that all of its crane operators working on the DOD activity have been trained in the proper use of all safety devices (e.g., anti-two block devices). Post certifications on the crane.

1.13 HOT WORK

Submit and obtain a written permit prior to performing "Hot Work" (welding, cutting, etc.) or operating other flame-producing/spark producing devices, from the Fire Division. A permit is required from the Explosives Safety Office for work in and around where explosives are processed, stored, or handled. CONTRACTORS ARE REQUIRED TO MEET ALL CRITERIA BEFORE A PERMIT IS

ISSUED. The Contractor will provide at least two (2) twenty (20) pound 4A:20 BC rated extinguishers for normal "Hot Work". All extinguishers shall be current inspection tagged, approved safety pin and tamper resistant seal. It is also mandatory to have a designated FIRE WATCH for any "Hot Work" done at this activity. The Fire Watch shall be trained in accordance with NFPA 51B and remain on-site for a minimum of 30 minutes after completion of the task or as specified on the hot work permit.

When starting work in the facility, require personnel to familiarize themselves with the location of the nearest fire alarm boxes and place in memory the emergency Fire Division phone number. ANY FIRE, NO MATTER HOW SMALL, SHALL BE REPORTED TO THE RESPONSIBLE FIRE DIVISION IMMEDIATELY.

1.14 FACILITY OCCUPANCY CLOSURE

Streets, walks, and other facilities occupied and used by the Government shall not be closed or obstructed without written permission from the Contracting Officer.

1.15 SEVERE STORM PLAN

In the event of a severe storm warning, the Contractor must:

a. Secure outside equipment and materials and place materials that could be damaged in protected areas.

b. Check surrounding area, including roof, for loose material, equipment, debris, and other objects that could be blown away or against existing facilities.

c. Ensure that temporary erosion controls are adequate.

PART 2 PRODUCTS

2.1 CONFINED SPACE SIGNAGE

Provide permanent signs integral to or securely attached to access covers for new permit-required confined spaces. Signs wording: "DANGER--PERMIT-REQUIRED CONFINED SPACE - DO NOT ENTER -" in bold letters a minimum of one inch in height and constructed to be clearly legible with all paint removed. The signal word "DANGER" shall be red and readable from 5 feet.

2.2 FALL PROTECTION ANCHORAGE

Leave in place fall protection anchorage, conforming to ASSE/SAFE Z359.1, installed under the supervision of a qualified person in fall protection, for continued customer use and so identified by signage stating the capacity of the anchorage (strength and number of persons who may be tied-off to it at any one time).

2.3 PERSONAL PROTECTIVE EQUIPMENT

All personnel who enter a construction site area shall wear Personal Protective Equipment (PPE) at all times as outlined in the EM 385-1-1. In addition to the requirements of EM 385-1-1, Safety Glasses ASSE/SAFE Z87.1 and High-Visibility Apparel (ANSI/ISEA 107 Performance Class II, Shirt or Vest) will be worn at all times on construction sites. Hearing protection is required in noise hazard areas or when performing noise hazard tasks.

Mandatory PPE on all construction sites includes:

a. Hard Hats

b. Safety Glasses

c. High-Visibility Shirt or Vest

d. Safety-Toed Shoes or Boots

PART 3 EXECUTION

3.1 CONSTRUCTION AND/OR OTHER WORK

Comply with USACE EM 385-1-1, NFPA 241, UFC 3-560-01, NFPA 70E, IEEE C2, the APP, the AHA, Federal and/or State OSHA regulations, and other related submittals and activity fire and safety regulations. The most stringent standard prevails.

3.1.1 Hazardous Material Use

Each hazardous material must receive approval from the Contracting Office or their designated representative prior to being brought onto the job site or prior to any other use in connection with this contract. Allow a minimum of 10 working days for processing of the request for use of a hazardous material.

3.1.2 Hazardous Material Exclusions

Notwithstanding any other hazardous material used in this contract, radioactive materials or instruments capable of producing ionizing/non-ionizing radiation (with the exception of radioactive material and devices used in accordance with USACE EM 385-1-1 such as nuclear density meters for compaction testing and laboratory equipment with radioactive sources) as well as materials which contain asbestos, mercury or polychlorinated biphenyls, di-isocynates, lead-based paint are prohibited. The Contracting Officer, upon written request by the Contractor, may consider exceptions to the use of any of the above excluded materials.

3.1.3 Unforeseen Hazardous Material

The design should have identified materials such as PCB, lead paint, and friable and non-friable asbestos and other OSHA regulated chemicals (i.e. 29 CFR 1910.1000). If additional material, not indicated, that may be hazardous to human health upon disturbance during construction operations is encountered, stop that portion of work and notify the Contracting Officer immediately. Within 14 calendar days the Government will determine if the material is hazardous. If material is not hazardous or poses no danger, the Government will direct the Contractor to proceed without change. If material is hazardous and handling of the material is necessary to accomplish the work, the Government will issue a modification pursuant to "FAR 52.243-4, Changes" and "FAR 52.236-2, Differing Site Conditions."

3.2 PRE-OUTAGE COORDINATION MEETING

Contractors are required to apply for utility outages at least 15 days in advance. As a minimum, the request should include the location of the outage, utilities being affected, duration of outage and any necessary

sketches. Special requirements for electrical outage requests are contained elsewhere in this specification section. Once approved, and prior to beginning work on the utility system requiring shut down, attend a pre-outage coordination meeting with the Contracting Officer to review the scope of work and the lock-out/tag-out procedures for worker protection. No work will be performed on energized electrical circuits unless proof is provided that no other means exist.

3.3 CONTROL OF HAZARDOUS ENERGY (LOCKOUT/TAGOUT)

Contractor shall ensure that each employee is familiar with and complies with these procedures and USACE EM 385-1-1, Section 12, Control of Hazardous Energy.

Contracting Officer will, at the Contractor's request, apply lockout/tagout tags and take other actions that, because of experience and knowledge, are known to be necessary to make the particular equipment safe to work on for government owned and operated systems.

No person, regardless of position or authority, shall operate any switch, valve, or equipment that has an official lockout/tagout tag attached to it, nor shall such tag be removed except as provided in this section. No person shall work on any energized equipment including, but not limited to activities such as erecting, installing, constructing, repairing, adjusting, inspecting, un-jamming, setting up, trouble shooting, testing, cleaning, dismantling, servicing and maintaining machines equipment of processes until an evaluation has been conducted identifying the energy source and the procedures which will be taken to ensure the safety of personnel.

No person shall work on any equipment that requires a lockout/tagout tag unless he, his immediate supervisor, project leader, or a subordinate has in his possession the stubs of the required lockout/tagout tags.

When work is to be performed on electrical circuits, only qualified personnel shall perform work on electrical circuits.

A supervisor who is required to enter an area protected by a lockout/tagout tag will be considered a member of the protected group provided he notifies the holder of the tag stub each time he enters and departs from the protected area.

Identification markings on building light and power distribution circuits shall not be relied on for established safe work conditions.

Before clearance will be given on any equipment other than electrical (generally referred to as mechanical apparatus), the apparatus, valves, or systems shall be secured in a passive condition with the appropriate vents, pins, and locks.

Pressurized or vacuum systems shall be vented to relieve differential pressure completely.

Vent valves shall be tagged open during the course of the work.

Where dangerous gas or fluid systems are involved, or in areas where the environment may be oxygen deficient, system or areas shall be purged, ventilated, or otherwise made safe prior to entry.

3.3.1 Tag Placement

Lockout/tagout tags shall be completed in accordance with the regulations printed on the back thereof and attached to any device which, if operated, could cause an unsafe condition to exist.

If more than one group is to work on any circuit or equipment, the employee in charge of each group shall have a separate set of lockout/tagout tags completed and properly attached.

When it is required that certain equipment be tagged, the Government will review the characteristics of the various systems involved that affect the safety of the operations and the work to be done; take the necessary actions, including voltage and pressure checks, grounding, and venting, to make the system and equipment safe to work on; and apply such lockout/tagout tags to those switches, valves, vents, or other mechanical devices needed to preserve the safety provided. This operation is referred to as "Providing Safety Clearance."

3.3.2 Tag Removal

When any individual or group has completed its part of the work and is clear of the circuits or equipment, the supervisor, project leader, or individual for whom the equipment was tagged shall turn in his signed lockout/tagout tag stub to the Contracting Officer. That group's or individual's lockout/tagout tags on equipment may then be removed on authorization by the Contracting Officer.

3.4 FALL HAZARD PROTECTION AND PREVENTION PROGRAM

Establish a fall protection and prevention program, for the protection of all employees exposed to fall hazards. Within the program include company policy, identify responsibilities, education and training requirements, fall hazard identification, prevention and control measures, inspection, storage, care and maintenance of fall protection equipment and rescue and evacuation procedures.

3.4.1 Training

Institute a fall protection training program. As part of the Fall Hazard Protection and Prevention Program, provide training for each employee who might be exposed to fall hazards. Provide training by a competent person for fall protection in accordance with USACE EM 385-1-1, Section 21.B.

3.4.2 Fall Protection Equipment and Systems

Enforce use of the fall protection equipment and systems designated for each specific work activity in the Fall Protection and Prevention Plan and/or AHA at all times when an employee is exposed to a fall hazard. Protect employees from fall hazards as specified in EM 385-1-1, Section 21. In addition to the required fall protection systems, safety skiff, personal floatation devices, life rings etc., are required when working above or next to water in accordance with USACE EM 385-1-1, Paragraphs 21.N through 21.N.04. Personal fall arrest systems are required when working from an articulating or extendible boom, swing stages, or suspended platform. In addition, personal fall arrest systems are required when operating other equipment such as scissor lifts if the work platform is capable of being positioned outside the wheelbase. The need for tying-off in such equipment is to prevent ejection of the employee from the equipment

during raising, lowering, or travel. Fall protection must comply with 29 CFR 1926.500, Subpart M, USACE EM 385-1-1 and ASSE/SAFE A10.32.

3.4.2.1 Personal Fall Arrest Equipment

Personal fall arrest equipment, systems, subsystems, and components shall meet ASSE/SAFE Z359.1. Only a full-body harness with a shock-absorbing lanyard or self-retracting lanyard is an acceptable personal fall arrest body support device. Body belts may only be used as a positioning device system (for uses such as steel reinforcing assembly and in addition to an approved fall arrest system). Harnesses shall have a fall arrest attachment affixed to the body support (usually a Dorsal D-ring) and specifically designated for attachment to the rest of the system. Only locking snap hooks and carabiners shall be used. Webbing, straps, and ropes shall be made of synthetic fiber. The maximum free fall distance when using fall arrest equipment shall not exceed 6 feet. The total fall distance and any swinging of the worker (pendulum-like motion) that can occur during a fall shall always be taken into consideration when attaching a person to a fall arrest system.

3.4.3 Fall Protection for Roofing Work

Implement fall protection controls based on the type of roof being constructed and work being performed. Evaluate the roof area to be accessed for its structural integrity including weight-bearing capabilities for the projected loading.

a. Low Sloped Roofs:

(1) For work within 6 feet of an edge, on low-slope roofs, protect personnel from falling by use of personal fall arrest systems, guardrails, or safety nets. A safety monitoring system is not adequate fall protection and is not authorized.

(2) For work greater than 6 feet from an edge, erect and install warning lines in accordance with 29 CFR 1926.500 and USACE EM 385-1-1.

b. Steep-Sloped Roofs: Work on steep-sloped roofs requires a personal fall arrest system, guardrails with toe-boards, or safety nets. This requirement also includes residential or housing type construction.

3.4.4 Existing Anchorage

Existing anchorage must be certified (or re-certified) by a qualified person for fall protection to be used for attachment of personal fall arrest equipment in accordance with ASSE/SAFE Z359.1. Existing horizontal lifeline anchorages must be certified (or re-certified) by a registered professional engineer with experience in designing horizontal lifeline systems.

3.4.5 Horizontal Lifelines

Design, install, certify and use under the supervision of a qualified person horizontal lifelines for fall protection as part of a complete fall arrest system which maintains a safety factor of 2 (29 CFR 1926.500).

3.4.6 Guardrails and Safety Nets

Design, install and use guardrails and safety nets in accordance with EM 385-1-1 and 29 CFR 1926 Subpart M.

3.4.7 Rescue and Evacuation Procedures

When personal fall arrest systems are used, the contractor must ensure that the mishap victim can self-rescue or can be rescued promptly should a fall occur. Prepare a Rescue and Evacuation Plan and include a detailed discussion of the following: methods of rescue; methods of self-rescue; equipment used; training requirement; specialized training for the rescuers; procedures for requesting rescue and medical assistance; and transportation routes to a medical facility. Include the Rescue and Evacuation Plan within the Activity Hazard Analysis (AHA) for the phase of work, in the Fall Protection and Prevention (FP&P) Plan, and the Accident Prevention Plan (APP).

3.5 SCAFFOLDING

Provide employees with a safe means of access to the work area on the scaffold. Climbing of any scaffold braces or supports not specifically designed for access is prohibited. Access scaffold platforms greater than 20 feet maximum in height by use of a scaffold stair system. Do not use vertical ladders commonly provided by scaffold system manufacturers for accessing scaffold platforms greater than 20 feet maximum in height. The use of an adequate gate is required. Ensure that employees are qualified to perform scaffold erection and dismantling. Do not use scaffold without the capability of supporting at least four times the maximum intended load or without appropriate fall protection as delineated in the accepted fall protection and prevention plan. Stationary scaffolds must be attached to structural building components to safeguard against tipping forward or backward. Give special care to ensure scaffold systems are not overloaded. Side brackets used to extend scaffold platforms on self-supported scaffold systems for the storage of material is prohibited. The first tie-in shall be at the height equal to 4 times the width of the smallest dimension of the scaffold base. Place work platforms on mud sills. Scaffold or work platform erectors shall have fall protection during the erection and dismantling of scaffolding or work platforms that are more than six feet. Delineate fall protection requirements when working above six feet or above dangerous operations in the Fall Protection and Prevention (FP&P) Plan and Activity Hazard Analysis (AHA) for the phase of work.

3.5.1 Stilts

The use of stilts for gaining additional height in construction, renovation, repair or maintenance work is prohibited.

3.6 EQUIPMENT

3.6.1 Material Handling Equipment

a. Material handling equipment such as forklifts shall not be modified with work platform attachments for supporting employees unless specifically delineated in the manufacturer's printed operating instructions.

b. The use of hooks on equipment for lifting of material must be in accordance with manufacturer's printed instructions.

c. Operators of forklifts or power industrial trucks shall be licensed in accordance with OSHA.

3.6.2 Weight Handling Equipment

a. Equip cranes and derricks as specified in EM 385-1-1, section 16.

b. Notify the Contracting Officer 15 days in advance of any cranes entering the activity so that necessary quality assurance spot checks can be coordinated. Contractor's operator shall remain with the crane during the spot check.

c. Comply with the crane manufacturer's specifications and limitations for erection and operation of cranes and hoists used in support of the work. Perform erection under the supervision of a designated person (as defined in ASME B30.5). Perform all testing in accordance with the manufacturer's recommended procedures.

d. Comply with ASME B30.5 for mobile and locomotive cranes, ASME B30.22 for articulating boom cranes, ASME B30.3 for construction tower cranes, and ASME B30.8 for floating cranes and floating derricks.

e. Under no circumstance shall a Contractor make a lift at or above 90 percent of the cranes rated capacity in any configuration.

f. When operating in the vicinity of overhead transmission lines, operators and riggers shall be alert to this special hazard and follow the requirements of USACE EM 385-1-1 Section 11 and ASME B30.5 or ASME B30.22 as applicable.

g. Do not crane suspended personnel work platforms (baskets) unless the Contractor proves that using any other access to the work location would provide a greater hazard to the workers or is impossible. Do not lift personnel with a line hoist or friction crane.

h. Inspect, maintain, and recharge portable fire extinguishers as specified in NFPA 10, Standard for Portable Fire Extinguishers.

i. All employees must keep clear of loads about to be lifted and of suspended loads.

j. Use cribbing when performing lifts on outriggers.

k. The crane hook/block must be positioned directly over the load. Side loading of the crane is prohibited.

l. A physical barricade must be positioned to prevent personnel from entering the counterweight swing (tail swing) area of the crane.

m. Certification records which include the date of inspection, signature of the person performing the inspection, and the serial number or other identifier of the crane that was inspected shall always be available for review by Contracting Officer personnel.

n. Written reports listing the load test procedures used along with any repairs or alterations performed on the crane shall be available for review by Contracting Officer personnel.

o. Certify that all crane operators have been trained in proper use of all safety devices (e.g. anti-two block devices).

p. Take steps to ensure that wind speed does not contribute to loss of control of the load during lifting operations. Prior to conducting lifting operations set a maximum wind speed at which a crane can be safely operated based on the equipment being used, the load being lifted, experience of operators and riggers, and hazards on the work site. This maximum wind speed determination shall be included as part of the activity hazard analysis plan for that operation.

3.6.3 Equipment and Mechanized Equipment

a. Proof of qualifications for operator shall be kept on the project site for review.

b. Manufacturer specifications or owner's manual for the equipment shall be on-site and reviewed for additional safety precautions or requirements that are sometimes not identified by OSHA or USACE EM 385-1-1. Incorporate such additional safety precautions or requirements into the AHAs.

3.7 EXCAVATIONS

Perform soil classification by a competent person in accordance with 29 CFR 1926.

3.7.1 Utility Locations

Prior to digging, the appropriate digging permit must be obtained. All underground utilities in the work area must be positively identified by a private utility locating service in addition to any station locating service and coordinated with the station utility department. Any markings made during the utility investigation must be maintained throughout the contract.

3.7.2 Utility Location Verification

The Contractor must physically verify underground utility locations by hand digging using wood or fiberglass handled tools when any adjacent construction work is expected to come within three feet of the underground system. Digging within 2 feet of a known utility must not be performed by means of mechanical equipment; hand digging shall be used. If construction is parallel to an existing utility expose the utility by hand digging every 100 feet if parallel within 5 feet of the excavation.

3.7.3 Shoring Systems

Trench and shoring systems must be identified in the accepted safety plan and AHA. Manufacture tabulated data and specifications or registered engineer tabulated data for shoring or benching systems shall be readily available on-site for review. Job-made shoring or shielding must have the registered professional engineer stamp, specifications, and tabulated data. Extreme care must be used when excavating near direct burial electric underground cables.

3.7.4 Trenching Machinery

Operate trenching machines with digging chain drives only when the

spotters/laborers are in plain view of the operator. Provide operator and spotters/laborers training on the hazards of the digging chain drives with emphasis on the distance that needs to be maintained when the digging chain is operating. Keep documentation of the training on file at the project site.

3.8 UTILITIES WITHIN CONCRETE SLABS

Utilities located within concrete slabs or pier structures, bridges, and the like, are extremely difficult to identify due to the reinforcing steel used in the construction of these structures. Whenever contract work involves concrete chipping, saw cutting, or core drilling, the existing utility location must be coordinated with station utility departments in addition to a private locating service. Outages to isolate utility systems must be used in circumstances where utilities are unable to be positively identified. The use of historical drawings does not alleviate the contractor from meeting this requirement.

3.9 ELECTRICAL

3.9.1 Conduct of Electrical Work

Underground electrical spaces must be certified safe for entry before entering to conduct work. Cables that will be cut must be positively identified and de-energized prior to performing each cut. Positive cable identification must be made prior to submitting any outage request for electrical systems. Arrangements are to be coordinated with the Contracting Officer and Station Utilities for identification. The Contracting Officer will not accept an outage request until the Contractor satisfactorily documents that the circuits have been clearly identified. Perform all high voltage cable cutting remotely using hydraulic cutting tool. When racking in or live switching of circuit breakers, no additional person other than the switch operator will be allowed in the space during the actual operation. Plan so that work near energized parts is minimized to the fullest extent possible. Use of electrical outages clear of any energized electrical sources is the preferred method. When working in energized substations, only qualified electrical workers will be permitted to enter. When work requires Contractor to work near energized circuits as defined by the NFPA 70, high voltage personnel must use personal protective equipment that includes, as a minimum, electrical hard hat, safety shoes, insulating gloves with leather protective sleeves, fire retarding shirts, coveralls, face shields, and safety glasses. In addition, provide electrical arc flash protection for personnel as required by NFPA 70E. Insulating blankets, hearing protection, and switching suits may also be required, depending on the specific job and as delineated in the Contractor's AHA.

3.9.2 Arc Flash Risk/Hazard Analysis

Contractor shall provide an Arc Flash Risk/Hazard Analysis in accordance with NFPA 70E for all locations where workers may be exposed to arc flash hazard (work on energized electrical equipment). The Arc Flash Risk/Hazard Analysis shall be sealed and signed by a qualified professional engineer.

In addition to Arc Flash Risk/Hazard Analysis required for safety during construction, provide an Arc Flash Risk/Hazard Analysis for the entire electrical distribution system as constructed. Provide equipment labels as required by NFPA 70E.

3.9.3 Arc Flash Risk/Hazard Analysis Qualifications

Contractor shall engage the services of a qualified organization to provide Arc Flash Risk/Hazard Analysis of the electrical distribution system. Organization shall be independent of the supplier, manufacturer, and installer of the equipment. The organization shall be a first tier subcontractor. This work shall not be performed by a second tier subcontractor.

a. Submit name and qualifications of organization. Organization shall have been regularly engaged in providing Arc Flash Risk/Hazard Analysis for a minimum of 5 years.

b. Submit name and qualifications of the professional engineer performing the analysis. Include a list of three comparable jobs performed by the engineer with specific names and telephone numbers for reference.

3.9.4 Contractor Electrical Energized Work Permit

All work on energized electrical systems must have an approved Contractor Electrical Energized Work Permit. The results of the Arc Flash Risk/Hazard Analysis shall be included in the "Contractor Electrical Energized Work Permit" request. Flame-resistant (FR) clothing and personal protective equipment (PPE) shall be rated for a minimum of 8 calories per square centimeter even if the flash hazard analysis indicates a lower value. A blank copy of the permit request is attached. An editable version may be obtained from the Contracting Officer.

3.9.5 Portable Extension Cords

Size portable extension cords in accordance with manufacturer ratings for the tool to be powered and protected from damage. Immediately remove from service all damaged extension cords. Portable extension cords shall meet the requirements of NFPA 70E and OSHA electrical standards.

3.10 WORK IN CONFINED SPACES

Comply with the requirements in Section 34 of USACE EM 385-1-1, OSHA 29 CFR 1910.146 and OSHA 29 CFR 1926.21(b)(6). Any potential for a hazard in the confined space requires a permit system to be used.

a. Entry Procedures. Prohibit entry into a confined space by personnel for any purpose, including hot work, until the qualified person has conducted appropriate tests to ensure the confined or enclosed space is safe for the work intended and that all potential hazards are controlled or eliminated and documented. (See Section 34 of USACE EM 385-1-1 for entry procedures.) All hazards pertaining to the space shall be reviewed with each employee during review of the AHA.

b. Forced air ventilation is required for all confined space entry operations and the minimum air exchange requirements must be maintained to ensure exposure to any hazardous atmosphere is kept below its' action level.

c. Sewer wet wells require continuous atmosphere monitoring with audible alarm for toxic gas detection.

-- End of Section --

CONTRACTOR ELECTRICAL ENERGIZED WORK PERMIT

PART I: TO BE COMPLETED BY THE REQUESTER: CONTRACT NUMBER: _____

JO/DO NUMBER_____ DATE OF REQUEST: _____

ANTICIPATED DATE WORK IS TO BE PERFORMED: _____.

(1) Description of circuit/equipment/job location:_____

_____

(2) Description of work to be done: _____

_____

(3) Justification of why the circuit/equipment cannot be de-energized or the work deferred until the next scheduled outage:

_____

_____

NOTE: ATTACHED COPY OF OUTAGE REQUESTS INCLUDING REASONS FOR DENIAL

_____ _____

Requester/Title Date

PART II: TO BE COMPLETED BY THE ELECTRICALLY QUALIFIED PERSONS DOING THE WORK:

	Check when Complete
(1) Detailed job description procedure to be used in performing the above detailed work: _____	☐
(2) Description of the Safe Work Practices to be employed: _____	☐
(3) Results of the Shock Hazard Analysis: _____	☐
(4) Determination of the Shock Protection Boundaries: _____	☐
(5) Results of the Arc Flash Hazard Analysis: _____	☐
Determination of the Arc Flash Protection Boundary: _____	☐
(6) Necessary personnel protective equipment to safely perform the assigned task:_____	☐
(7) Means employed to restrict the access of unqualified persons from the work area:_____	☐
(8) Evidence of completion of a Job Briefing including discussion of any job – related hazards:_____	☐

(10) Do you agree the above described work can be done safely? ☐ Yes ☐ No (If no, return to requester)

PART III: RECOMMEND APPROVAL(S) TO PERFORM THE WORK WHILE ELECTRICALLY ENERGIZED:

_____ _____ _____

OICC SIGNATURE **CI SIGNATURE** **OPS SIGNATURE**

_____

NAVFAC MIDLANT CONTRUCTION SAFETY MANAGER

PART IV: FINAL APPROVAL:

_____

NAVFAC MILANT COMMANDING OFFICER

NOTE: COMPLETED FORM WILL BE KEPT ON FILE BY MIDLANT CONSTRUCTION SAFETY MANAGER

CONTRACTOR ELECTRICAL ENERGIZED WORK PERMIT

1. Detailed job description procedure to be used in performing the above detailed work:

2. Description of the Safe Work Practices to be employed

SECTION 01 45 00.05 20

DESIGN AND CONSTRUCTION QUALITY CONTROL
04/10

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM E 329	(2009) Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2008) Safety and Health Requirements Manual

U.S. GREEN BUILDING COUNCIL (USGBC)

LEED	(2002; R 2005) Leadership in Energy and Environmental Design(tm) Green Building Rating System for New Construction (LEED-NC)

U.S. DEPARTMENT OF DEFENSE (DOD) UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-300-09N	Design Procedures

1.2 SUBMITTALS

The use of a "G" following a submittal indicates that a Government approval action is required. Submit the following in accordance with Section 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES and Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES.

SD-01 Preconstruction Submittals

Design Quality Control (DQC) Plan; G

Submit a DQC Plan prior to the Post Award Kickoff Meeting.

Construction Quality Control (CQC) Plan; G

Submit a Construction QC Plan prior to start of construction.

Commissioning Plan; G

Submit a Commissioning Plan within 60 days of approval of Cx agent.

SD-06 Test Reports

Acceptance Testing of Critical Systems Checklist

SD-07 Certificates

Preliminary Inspections and Final Acceptance Testing; G

Final Life Safety/Fire Protection Certification; G

IBC Special Inspections Certification; G

SD-11 Closeout Submittals

Summary Commissioning Report; G

Training Course Outline; G

Training Video Recording; G

1.3 QC PROGRAM REQUIREMENTS

Establish and maintain a QC program that is administered by a Design and Construction Quality Control organization, using Quality Control (Design and Construction) Plans, Commissioning Plans and Reports, meetings, a Coordination and Mutual Understanding Meeting, three phases of control, submittal review and approval, testing, completion inspections, and QC certifications and documentation necessary to provide design, materials, equipment, workmanship, fabrication, construction and operations which comply with the requirements of this Contract. The QC program shall cover on-site and off-site work. No construction work or testing may be performed unless the QC Manager is on the work site.

1.3.1 Design and Construction Quality Control Plans

The Contractor shall provide a project specific Design Quality Control (DQC) Plan and Construction Quality Control (CQC) Plan, for review and approval by the Government. The Contractor shall perform no design until the DQC Plan is approved and no construction until the CQC Plan is approved. The Contractor's plan shall include the following:

a. The QC organization for this contract, including member resumes.

b. A letter from an officer of the company designating the QC Manager, Alternate QC Manager, and Commissioning Authority, and their authority.

c. QC Manager qualifications.

d. Commissioning Authority qualifications and certification.

e. List of Definable Features of Work (DFOW) including list of design submittal packaging. DFOW is a task that is separate and distinct from other tasks and has control requirements and work crews unique to the task.

f. For the QC Plan. a plan to implement the "Three Phases of Control" for each DFOW.

g. For the QC Plan, a testing Plan, log and list of personnel and accredited laboratories that will perform tests. Construction materials testing laboratories must be accredited by a laboratory

accreditation authority and will be required to submit a copy of the Certificate of Accreditation and Scope of Accreditation with the testing plan.

h. Submittal Log including design submittals, listing personnel who will review submittals and noting submittals for Government review.

i. Procedures for submitting and reviewing variations prior to submission to the Government.

j. As a part of the Contractor's plan, a statement of Special Inspections shall be prepared by the Designer of Record (DOR) describing a complete list of materials and work requiring special inspections, the inspections to be performed and any applicable quality assurance plans and structural observations. The Contractor's plan shall implement the applicable requirements of the International Building Code (IBC), Chapter 17 "Structural Tests and Special Inspections." The plan shall include a listing of the individuals, approved agencies or firms that will be retained for conducting the required special inspections accompanied by a description of individual inspector's experience and a copy of all required certifications. Structural tests and special inspections, as outlined in Chapter 17 of the IBC shall be conducted by individuals and agents that are under the direct supervision of a Registered Design Professional (RDP) and meet the requirements of ASTM E 329.

k. A plan for assuring the proper design, construction, installation of all life safety and fire protection features across all disciplines and trades. Examples of life safety and fire protection features include, but are not limited to, water distribution systems including fire pumps and fire hydrants, fire resistive assemblies such as fire rated walls/partitions and spray-applied fire proofing of structural components, fire alarm and detection systems, fire suppression and standpipe systems, means of egress components, emergency and exit lighting fixtures. As a part of the plan, a statement of Special Inspections shall be prepared by the Fire Protection Engineer Designer of Record (DOR) describing a complete list of materials and work requiring special inspections, the inspections to be performed and any applicable quality assurance plans and fire protection observations. The plan will include a listing of the individuals, approved agencies or firms that will be retained for conducting the required special inspections accompanied by a description of individual inspector's experience and a copy of all required certifications.

l. For the DQC plan, submit a formal Communication Plan the indicates the frequency of design meetings and what information is covered in those meetings, key design decision points tied to the Network Analysis Scheduled and how the DOR plans to include the Government in those decisions, peer review procedures, interdisciplinary coordination, design review procedures, comment resolution, etc.

The Communication Plan will emphasize key decisions and possible problems the Contractor and Government may encounter during the design phase of the project. Provide a plan to discuss design alternatives and design coordination with the stakeholders at the key decision points as they arise on the project. Identify individual stakeholders and suggested communication methods that will be employed to expedite and facilitate each anticipated critical decision. Communication methods may include: Concept Design Workshop, over-the-shoulder review

meetings, presentation at client's office, lifecycle cost analysis presentation, technical phone conversation, and formal review meeting. The design portion of the Communication Plan must to be written by the Commissioning Authority and confirmed during the Post Award Kick off Partnering. Update the Communication Plan at every Partnering meeting.

m. For the DQC Plan, procedures for insuring the design documents are submitted in accordance with UFC 1-300-09N DESIGN PROCEDURES and other procedures to ensure disciplines have been properly coordinated to eliminate conflicts.

n. For the DQC Plan, a list of design subcontractors and the scope of the work which each firm will accomplish.

1.3.2 Commissioning Plan

The Commissioning Authority shall provide a project specific Commissioning Plan for review and acceptance by the Government. Develop and submit the Commissioning Plan to define the on-site activities and roles and responsibilities for commissioning all building systems required by the Project Program paragraph entitled, Building Commissioning. The Commissioning Plan shall include all items required by the LEED version 2.2 and shall also include the following:

a. Provide a description of the Commissioning Authority's roles and responsibilities as well as organizational relationships with the Contractor's QC Manager and verification and testing personnel.

b. Provide a schedule of inspections during construction that includes periodic inspections by the system designer. Specify a minimum of three inspections.

c. Define the sequence and schedule for starting and balancing air distribution systems to ensure construction materials, such as architectural finishes, are installed under the appropriate environmental conditions. Also address the procedure that will be used to "dry out" the structure.

d. Provide a schedule for all verification and functional performance tests. The Commissioning Authority shall be present for all functional performance tests.

e. Provide a schedule detailing training sessions for Government personnel. Training seeions are to address maintenance and operation of systems required to be commissioned.

f. Provide acceptance testing for critical systems as identified by NAVFAC Engineering & Construction Bulletin ECB issue 2008-03 dated 9/25/2008, attached. Provide the requirements identified under the "Ktr" column for all applicable project elements. The requirements identified are minimum requirements and do not reduce the requirements contained in the technical sections. Provide Acceptance Testing of Critical Systems Checklist showing compliance for all applicable elements for approval by the Contracting Officer.

1.3.3 Summary Commissioning Report

The Commissioning Authority whall provide a Summary Commissioning Report. The Summary Commissioning Report shall include all items required by LEED

version 2.2.

1.4 QC ORGANIZATION

The QC Manager shall report to an officer of the firm and shall not be subordinate to the Project Superintendent or the Project Manager. The Contractor Quality Control (QC) person cannot be the Project Superintendent or the Project Manager on this project.

1.4.1 QC and Alternative QC Manager

QC and Alternative QC Manager qualifications:

a. Complete the course entitled "Construction Quality Management (CQM) for Contractors" and shall maintain a current certificate.

b. Five years of combined experience as a Superintendent, QC Manager, Project Manager, or Project Engineer on similar size and type construction contracts, and at least two years experience as a QC Manager.

c. Familiar with requirements of USACE EM 385-1-1, and experience in the areas of hazard identification and safety compliance.

QC and Alternative QC Manager responsibilities:

a. Participate in the Post Award Kick-off, Partnering, Preconstruction, Design Development, and Coordination and Mutual Understanding Meetings.

b. Implement the "Three Phase of Control" plan for each DFOW and notify the Contracting Officer at least 3 business days in advance of each Preparatory and Initial Phase meeting. Submit respective checklists to the Contracting Officer the next business day.

c. Ensure that no construction begins before the DOR has finalized the design for that segment of work, and construction submittals are approved as required.

d. Inspect all work and rework, using International Conference of Building Officials certified QC specialists as applicable, to ensure its compliance with contract requirements. Maintain a rework log.

e. Immediately stop any segment of work, which does not comply with the contract and plans and specifications, and direct the removal and replacement of any defective work.

f. Remove any individual from the site who fails to perform their work in a skillful, safe and workmanlike manner or whose work does not comply with the contract plans and specifications.

g. Prepare daily QC Reports.

h. Ensure that Contractor Production Reports are prepared daily.

i. Hold weekly QC meetings with the Commissioning Authority, DOR (or representative), Superintendent and the Contracting Officer; participation shall be suitable for the phase of work. Distribute minutes of these meetings.

j. Ensure that design and construction submittals are reviewed and approved, as required by the contract, prior to allowing material on site and work to proceed with these items. Maintain a submittal log.

k. Update As-built drawings daily, maintaining up-to-date set on site.

l. Maintain a testing plan and log. Ensure that all testing is performed in accordance with the contract. Review all test reports and notify the Contracting Officer of all deficiencies, along with a proposal for corrective action.

m. Maintain rework log on site, noting dates deficiency identified, and date corrected.

n. Certify and sign statement on each invoice that all work to be paid under the invoice has been completed in accordance with contract requirements.

o. Perform Punch-out and participate in Pre-final and Final Inspections. Submit list of deficiencies to the Contracting Officer for each inspection. Correct all deficiencies prior to the Final inspection. Notify Contracting Officer prior to final inspection to establish a schedule date acceptable by the Contracting Officer.

p. Ensure that all required keys, operation and maintenance manuals, warranty certificates, and the As-built drawings are correct and complete, in accordance with the contract, and submitted to the Contracting Officer.

q. Assure that all applicable tests, special inspections, and observations required by the contract are performed.

r. Coordinate all factory and on-site testing, Testing Laboratory personnel, QC Specialists, and any other inspection and testing personnel required by this Contract.

s. Notify the Contracting Officer of any proposed changes to the QC plan.

t. Retain a copy of approved submittals at project site, including Contractor's copy of approved samples.

u. Update the Performance Assessment Plan as described in the UFGS Section 01 31 19.05 20 POST AWARD MEETINGS and discuss monthly at a QC meeting.

1.4.2 Commissioning Authority

The Commissioning Authority shall be a member of the QC organization, shall coordinate actions with the QC Manager, shall not be subordinate to the Project Superintendent or the Project Manager, and shall report findings directly to the government.

The Commissioning Authority shall meet the requirements of LEED with the following additional qualifications:

a. A minimum of 5 years experience as a design Architect or Engineer on similar size and type designs /or design-build contracts. Provide

education, experience, and management capabilities on similar size and type contracts.

b. Be certified by a recognized Building Commissioning Organization. Acceptable minimum certifications are "Certified Cx Agent" from the Associated Air Balance Council (AABC); "Certified Building Cx Professional" from the Association of Energy Engineers (AEE); "Certified Cx Professional (CxP)" from the Building Commessioning Association (BCA); or "Commissioning Process Authority Professional" or Commissioning Process Manager" from the University of Wisconsin College of Engineering.

Commissioning Authority responsibilities:

a. Lead the Design Quality Control actions and be responsible for the design integrity, professional design standards, and all design services required.

b. May be a member of the Designer of Record's (DOR) firm if independent of the project's design and construction management.

c. Be responsible for development of the design portion of the QC Plan, the Commissioning Plan, incorporation and maintenance of the approved Design Schedule, and the preparation of DQC Reports, Summary Commissioning Report, and minutes of all design meetings.

d. Participate in the Post Award Kick-Off, all design planning meetings, design presentations, partnering, and QC meetings.

e. Implement the DQC plan and Commissioning Plan and shall remain on staff involved with the project until completion of the project.

f. Be cognizant of and assure that all design documents on the project have been developed in accordance with the Contract, and have been properly coordinated.

g. Develop the submittal register. Coordinate with each DOR to determine what items need to be submitted, and who needs to approve.

h. Coordinate all training issues and validate that the testing and training requirements of this contract are accomplished.

i. Provide QC certification for design compliance.

j. Certify and sign statement on each invoice that all work to be paid to the DOR under the invoice has been completed in accordance with the contract requirements.

k. Prepare weekly DQC Reports that documents the work the design team accomplished that week.

1.4.3 QC Specialists

QC Specialists shall assist and report to the QC Manager and may perform production related duties but must be allowed sufficient time to perform their assigned quality control duties. QC Specialists are required to attend the Coordination and Mutual Understanding Meeting, QC meetings and be physically present at the construction site to perform the three phases of control and prepare documentation for each definable feature of work in

their area of responsibility at the frequency specified below.

1.4.3.1 Fire Protection QC Specialist

The Fire Protection QC Specialist shall be a U.S. Registered Fire Protection Engineer (FPE) and shall be an integral part of the Prime Contractor's Quality Control Organization. This FPE shall have no 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 may serve as the lead Fire Protection QC Specialist, provided the following qualifications are met.

a. Qualifications/Experience: The FPE shall 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 FPE is responsible for assuring the proper construction and installation of life safety and fire protection features across all disciplines and trades. The FPE shall be 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, emergency and exit lighting fixtures, etc.

c. Construction Surveillance: The FPE shall 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 shall occur just prior to installation of suspended ceiling system to inspect the integrity of passive fire protection features and fire suppression system piping, and required performance verification testing of all life safety and fire protection systems identified below and in Part 4.

(1) Preliminary Inspections and Final Acceptance Testing: FPE shall personally witness all preliminary inspections of fire alarm/detection and suppression systems. Once preliminary inspections have been successfully completed, the FPE shall 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 shall submit the request for formal inspection at least 15 days prior to the date the inspection is to take place. The QC manager

shall provide 10 days advance notice to the Contracting Officer and the activity Fire Inspection Office of scheduled final inspections.

(2) Final Life Safety/Fire Protection Certification Documentation: The FPE shall provide certification that all life safety and fire protection systems have been inspected and, in the FPE's professional judgment, have been installed in accordance with the contract documents, approved submittals, and manufacturer's requirements. This certification shall summarize all life safety and fire protection features, and shall bear the professional seal of the fire protection engineer.

1.4.3.2 Mechanical QC Specialist

Qualification/Experience in Area of Responsibility	Area of Responsibility	Frequency
Mechanical Inspector, International Conference of Building Officials (ICBO) Certified/ 5 years minimum	Installation and Testing of Boilers	Minimum 3 times a week during installation and full-time during testing
Elevator Inspector, International Conference of Building Officials (ICBO) Certified/ 5 years minimum	Testing of Elevators	Minimum 3 times a week during installation and full-time during testing
Mechanical Testing QC Specialist/Registered Mechanical Engineer, (PE)	Testing of Mechanical Systems	Full-time during testing

1.4.3.3 Soils Testing/Pile Installation and Testing QC Specialists

Provide IBC Special Inspections Certification provided by the following specialist(s):

Qualification/Experience in Area of Responsibility	Area of Responsibility	Frequency
Under Supervision of P.E.	Soil Testing Pile Installation And Testing	See IBC Chapter

1.5 THREE PHASES OF CONTROL

The Three Phases of Control shall adequately cover both on-site and off-site work and shall include the following for each DFOW.

1.5.1 Preparatory Phase

Notify the Contracting Officer at least two work days in advance of each preparatory phase meeting. The meeting shall be conducted by the QC Manager and attended by the Project Superintendent, QC Specialists, and the foreman responsible for the DFOW. The Commissioning Authority shall also

attend if required by structural tests and special inspections, as outlined in Chapter 17 of the IBC and the DQC Plan. When the DFOW will be accomplished by a subcontractor, that subcontractor's foreman shall attend the preparatory phase meeting. Document the results of the preparatory phase actions in the daily Contractor Quality Control Report and in the Preparatory Phase Checklist. Perform the following prior to beginning work on each DFOW:

a. Review each paragraph of the applicable specification sections;

b. Review the Contract drawings;

c. Verify that appropriate shop drawings and submittals for materials and equipment have been submitted and approved. Verify receipt of approved factory test results, when required;

d. Review the testing plan and ensure that provisions have been made to provide the required QC testing;

e. Examine the work area to ensure that the required preliminary work has been completed;

f. Examine the required materials, equipment and sample work to ensure that they are on hand and conform to the approved shop drawings and submitted data;

g. Discuss the specific controls used in construction methods, construction tolerances, workmanship standards, and the approach that will be used to provide quality construction by planning ahead and identifying potential problems for each DFOW; and

h. Review the APP and appropriate Activity Hazard Analysis (AHA) to ensure that applicable safety requirements are met, and that required Material Safety Data Sheets (MSDS) are submitted.

1.5.2 Initial Phase

Notify the Contracting Officer at least two work days in advance of each initial phase. When construction crews are ready to start work on a DFOW, conduct the initial phase with Project Superintendent, the QC Specialists, and the foreman responsible for that DFOW. The Commissioning Authority shall also attend if required by structural tests and special inspections, as outlined in Chapter 17 of the IBC and the DQC Plan. Observe the initial segment of the DFOW to ensure that the work complies with Contract requirements. Document the results of the initial phase in the daily CQC Report and in the Initial Phase Checklist. Repeat the initial phase for each new crew to work on-site, or when acceptable levels of specified quality are not being met. Perform the following for each DFOW:

a. Establish the quality of workmanship required;

b. Resolve conflicts;

c. Ensure that testing is performed by the approved laboratory, and

d. Check work procedures for compliance with the APP and the appropriate AHA to ensure that applicable safety requirements are met.

e. Ensure manufacturer's representative has performed necessary

inspections, if required.

1.5.3 Follow-Up Phase

Perform the following for on-going work daily, or more frequently as necessary, until the completion of each DFOW and document in the daily CQC Report:

a. Ensure the work is in compliance with Contract requirements;

b. Maintain the quality of workmanship required;

c. Ensure that testing is performed by the approved laboratory; and

d. Ensure that rework items are being corrected.

1.5.4 Additional Preparatory and Initial Phases

Additional preparatory and initial phases shall be conducted on the same DFOW if the quality of on-going work is unacceptable, if there are changes in the applicable QC organization, if there are changes in the on-site production supervision or work crew, if work on a DFOW is resumed after substantial period of inactivity, or if other problems develop.

1.5.5 Notification of Three Phases of Control for Off-Site Work

Notify the Contracting Officer at least two weeks prior to the start of the preparatory and initial phases.

1.6 COMPLETION INSPECTIONS

The Contractor shall perform the necessary prefinal inspections, compile punchlists, and correct deficiencies. Notify the Contracting Officer 5 calendar days prior to the date a prefinal inspection can be held. Notify the Contracting Officer at least 14 calendar days prior to the date a final acceptance inspection can be held. The Government will perform final inspection to verify that the facility is complete and ready to be occupied. All items previously identified on the prefinal punchlist will have been corrected and acceptable.

1.7 TRAINING

The Commissioning Authority shall provide a comprehensive project-specific Government personnel training program for the systems of the facility specified in the technical specifications of this Contract. The core of this training will be based on manufacturer's recommendations and the operation and maintenance support information (OMSI) provided as a part of this Contract. Training shall include classroom discussion as well as hands on maintenance, replacement of typical components and repair type maintenance training for parts typically replaced or repaired in the field, such as:

1. Domestic water pressure boosting system

2. Plumbing systems, including temperature actuated thermostatic water mixing valve

3. HVAC Systems, including chillers, boilers, heat pumps, air handling equipment, exhaust fans, fan coil units, hot and chilled

water pumping system

4. Steam condensate pumps

5. Direct Digital Controls/Space Temperature Controls

6. Electrical systems, including transformers, diesel-electric generator sets, automatic transfer switches, primary switchgear, secondary switchgear, high voltage switchgear, variable frequency drives, and frequency converters

7. Fire protection systems, including fire alarm systems and detection systems

8. Site mechanical utilities, including cathodic protection

9. Site electrical utilities, including substations, transformers, and pad mounted switchgear

10. Wastewater pump systems

Provide each trainee in the course a written training course outline. Submit outline for approval at least 90 calendar days prior to training session. Provide to the Contracting Officer two copies of the training video recording in DVD format. Confirm media format required with the using activity. The recording shall capture, in video and audio, all instructors training presentations including question and answer periods with the trainees.

1.8 DOCUMENTATION

Maintain current and complete records of on-site and off-site QC program operations and activities.

-- End of Section --

CAPITAL IMPROVEMENTS

ENGINEERING & CONSTRUCTION Bulletin

Issue No. 2008-03 **25 September 2008** **Type: Policy**

Subject: **Acceptance Testing of Critical Systems**

Reference: (a) ECB 2007-01 Proper use of Military Construction Funds, 13 October 2006

Enclosure: (1) Roles and Responsibilities (R&R) Matrices

Cancelled: NAVFAC Instruction 12271.1: NAVFAC Total Building Commissioning Policy, dated 23 October 2003

1. Purpose.

To focus NAVFAC's technical oversight of acceptance testing during construction on five critical areas (electrical, fire and life safety, mechanical, roofing, and underwater structures) to ensure the constructed facility performs as intended and meets the needs of the supported commands; to define the use of Post Construction Award Services (PCAS) funding as it applies to the Capital Improvements Business Line (CIBL) in-house acceptance testing and technical support efforts.

2. Background.

NAVFAC has identified five critical areas that have consistently caused problems in facilities delivered to its supported commands. These areas are electrical, fire and life safety, mechanical, roofing systems, and underwater structures. These five critical areas were identified as requiring ongoing, thorough construction technical oversight in support of acceptance testing. A NAVFAC Team of technical experts determined how to apply responsible oversight to these five critical areas using one-half of PCAS funds. Each Team compiled all systems / sub-systems and developed R&R matrices (enclosure (1)). Each matrix identifies responsibilities of each of the contributors to the quality and functionality of the completed project, including the contractor, Facilities Engineering Command's (FEC) Integrated Product Team (IPT) and Facilities Engineering and Acquisition Division (FEAD) technical staff. The matrices served as the basis for determining the level of effort (man hours) to perform the technical support for acceptance testing. The following table shows the format in the R&R matrices. Each heading is provided with a description of each column's intent:

System	Sub-System	Phase	Element	Ktr QC-DOR (Project Req'ts)	FEAD (SIOH)	FEC (PCAS)
Major system grouping	Specific system	Phase of the project where it will occur	The item or task to be accomplished	What actions, if any, need to be taken by the appropriate party? (Indicates funding method)		

The contractor is still responsible for delivering a high quality and properly functioning facility via the Contractor Quality Control (CQC) program and commissioning process (including documentation and training).

3. Policy and Implementation.

The following will apply to the performance of acceptance testing for the five critical areas:

a. This applies to Military Construction (MILCON) and all Special Projects with costs over $750,000 for design-build and design-bid-build contracts.
b. The Project Manager (PM) shall manage, in coordination with the Construction Manager (CM), the project PCAS funds. The PM shall ensure that PCAS funding is used in accordance with reference (a).
c. The average funds available to support the CIBL acceptance testing in-house effort will be one-half the total PCAS funds.
d. Enclosure (1) defines the roles and responsibilities of the contractor, FEC's IPT and FEAD technical staff.
e. While the FEAD will be responsible for managing the overall construction project, the FEC's IPT will be responsible for the technical support for the acceptance testing effort associated with the five critical areas. Technical support from the FEAD can be leveraged as capabilities and resources allow, and must be coordinated between the FEC IPT and FEAD. The support for the five critical areas will be provided by engineers that have been trained and are experienced in that area.
f. The CM will manage the day-to-day coordination with the contractor and coordinate the necessary reach back to the FEC IPT for technical support for acceptance testing.
g. PCAS must be budgeted and included in the project costs. The PCAS costs must be shown in the budget estimate summary sheets (BESS) on the DD 1391.
h. The Public Works Business Line (PWBL) has agreed to designate representatives who are responsible for facility maintenance and sustainment to perform the following:
    i. Participate in the submittal review process by providing comments on submittals for the critical areas.
    ii. Be present for the final inspections and tests.
    iii. Be present for all system training.
    iv. Provide feedback and lessons learned to the FEC CI4.
i. It is recommended that the designated representatives, who are responsible for maintenance and sustainment visit the site during construction to become familiar with the building systems.
j. The efforts in paragraph 3.h above will not be funded using PCAS or supervision, inspection and overhead (SIOH).

JOSEPH E. GOTT, P.E.
Chief Engineer and Director,
Capital Improvements

Note: This ECB has been coordinated with Headquarters, U.S. Marine Corps (Code LFF).

ELECTRICAL ENGINEERING ROLES and RESPONSIBILITIES

System	Sub-Systems	Phase	Elements	EE QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
All Systems	**Submittals & Plans**	Pre-Construction	Qualifications of Installer, Shop Drawings, Data Sheets, and Calculations (as applicable)	A	C	S
			QC Plan		A	S
			Performance Verification Plan		A	S
	Certificates & Reports	Construction	Functional Acceptance Test Procedure	A	C	S
			Preliminary Test Reports	A	RA	S
			Final Acceptance Test Reports	A	C	S
Power Generators	**Single Operation Generator Sets**	Test Preparation	Perform fuel oil piping tests	V	C	-
			Perform acceptance checks and tests	V	W	C
			Perform preliminary operations	V	W	C
		Final Test	Test all engine protective shutdown devices	V	—	W
			Test all pre-shutdown alarm devices	V	—	W
			Test crank cycle/terminate relay	V	—	W
			Test automatic and manual operations in all possible scenarios involving loss of utility, return of utility, manual starting, and emergency stop	V	—	W
			Perform load test	V	—	W
	Automatic Transfer Switches	Test Preparation	Perform acceptance checks and tests	V	W	C
		Final Test	Simulate loss of normal power	—	—	W
			Simulate return of normal power	V	—	W
			Simulate loss of emergency power	V	—	W
			Simulate all forms of single-phase conditions	V	—	W
			Verify operation of normal power voltage-sensing relays	V	—	W
			Verify engine start sequence	V	—	W
			Verify time delay upon transfer	V	—	W
			Verify operation of alternate power voltage-sensing relays	V	—	W
			Verify automatic transfer operation	V	—	W
			Verify interlocks and limit switch operation	V	—	W
			Verify time delay and retransfer upon normal power restoration	V	—	W
400-Hertz Solid State Frequency Converter	**All**	Test Preparation	Perform acceptance checks and tests	V	W	C
			Verify equipment nameplate information with specifications and approved shop drawings	V	W	—
			Inspect physical and mechanical condition	V	W	—
			Verify correct equipment grounding	V	W	—
			Perform resistance measurements through all bolted connections	V	W	—
			Perform preliminary operations	V	W	C
		Final Test	Test all control devices	V	—	W
			Test all protective shutdown devices	V	—	W
			Perform load test	V	—	W
			Perform transient tests	V	—	W
			Perform harmonic distortion tests	V	—	W
			Perform automatic line drop compensation test	V	—	W

KEY = A - Approve, R - Review, W - Witness, RA - Receipt Acknowledge, S - Surveilance Review, V- Verification and Testing, C - Copy, QA - Quality Assurance

ELECTRICAL ENGINEERING ROLES and RESPONSIBILITIES

System	Sub-Systems	Phase	Elements	EE QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
Uninterruptible Power Supply (UPS)	All	Test Preparation	Verify ventilation equipment in UPS and battery rooms are operational	V	W	—
			Verify battery cells are filled with electrolyte	V	W	—
			Verify polarity of DC connections and phase rotation of AC connections	V	W	—
			Verify AC power to all equipment	V	W	—
			Verify remote monitors and control wiring	V	W	—
			Verify UPS system and battery system is properly grounded	V	W	—
			Verify operation of emergency shower and eye wash	V	W	—
			Verify control connections between UPS and emergency engine generator signal contacts	V	W	—
			Verify control connections between UPS module and UPS maintenance bypass cabinet	V	W	—
			Perform acceptance checks and tests	V	W	C
		Final Test	Perform load tests	V	—	W
			Perform full-load burn in test	V	—	W
			Perform battery discharge test	V	—	W
			Perform battery performance test	V	—	W
			Perform UPS in conjunction with emergency generator service (if applicable)	V	—	W
Lighting	Interior Lighting	Final Test	Verify electronic dimming ballasts operatation over full range of dimming capability without any visually detectable flicker	V	W	—
			Verify occupancy sensors operation	V	W	—
			Verify lighting controls operation	V	W	—
			Verify lighting output levels	V	W	—
	Exterior Lighting	Final Test	Verify photocell aiming and operation	V	W	—
			Verify lighting controls operation	V	W	—
			Verify lighting output levels	V	W	—
Transformers	Single-Phase Pad-Mounted Transformers	Factory Routine Tests	Perform resistance measurements, polarity, ratio, no-load losses and excitation current, load losses and impedance voltage, dielectric, leak (liquid-filled), and disolved gas analysis (liquid-filled) tests	—	—	W
		Field Tests	Perform acceptance checks and tests	V	W	C
	Three-Phase Pad-Mounted Transformers	Factory Routine Tests	Perform resistance measurements, polarity, ratio, no-load losses and excitation current, load losses and impedance voltage, dielectric, leak (liquid-filled), and disolved gas analysis (liquid-filled) tests	—	—	W
		Field Tests	Perform acceptance checks and tests	V	W	C
	Secondary Unit Substations	Factory Routine Tests	Perform resistance measurements, polarity, ratio, no-load losses and excitation current, load losses and impedance voltage, and dielectric tests	—	—	W
		Field Tests	Perform acceptance checks and tests	V	W	C
	Primary Unit Substations	Factory Routine Tests	Perform resistance measurements, polarity, ratio, no-load losses and excitation current, load losses and impedance voltage, dielectric, leak (liquid-filled), and disolved gas analysis (liquid-filled) tests	—	—	W
		Field Tests	Perform acceptance checks and tests	V	W	C

KEY = A - Approve, R - Review, W - Witness, RA - Receipt Acknowledge, S - Surveilance Review, V- Verification and Testing, C - Copy, QA - Quality Assurance

ELECTRICAL ENGINEERING ROLES and RESPONSIBILITIES

System	Sub-Systems	Phase	Elements	EE QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
Switchgear/ Switchboards	Metal-Clad Switchgear / Switchboards and Busway	Factory Production Tests	60 Hz dielectric, mechanical operation, electrical operation and control wiring, and ground fault sensing equipment tests	—	—	W
		Test Preparation	Perform acceptance checks and tests	V	W	C
Cable	Medium-Voltage Cable, Terminations, and Splices	Test Preparation	Perform acceptance checks and tests	V	W	—
		Field Tests	Perform shield continuity and very low frequency (VLF) tests	V	W	—
SF6 Switch - Padmount	Medium Voltage Pad-mounted Switches	Factory Production Tests	60 Hz dielectric, mechanical operation, electrical operation and control wiring, and ground fault sensing equipment tests	—	—	W
		Test Preparation	Perform acceptance checks and tests	V	W	C
Airfield Lighting	Airfield Lighting Circuits	Field Tests	Airfield lighting circuits low voltage continuity and high voltage insulation resistance tests	V	W	—
		Field Tests	Airfield lighting circuit operating test	V	W	—
	Counterpoise	Field Tests	Counterpoise system test	V	W	—
	Constant	Field Tests	Perform open circuit protector and load tests	V	W	—
	All	Field Tests	Perform airfield lighting system operation test	V	W	—
Cathodic Protection	Cathodic Protection by Galvanic Anodes	Field Tests	Perform non-destructive testing of anodes	V	W	—
			Perform destructive testing of anodes	V	W	—
			Perform base potential tests, insulation joint testing, electrical continuity testing, pipe casing testing, anode-to-soil potential tests, anode output tests, protected potential measurement tests, and interference testing.	V	W	—
			Perform field operation tests.	V	—	W
	Cathodic Protection by Impressed Current	Field Tests	Perform non-destructive testing of anodes	V	W	—
			Perform destructive testing of anodes	V	W	—
			Perform base potential tests, permanent reference electrode calibration, insulation joint testing, electrical continuity testing, rectifier system testing, pipe casing testing, protected potential measurement tests, and interference testing.	V	W	—
			Perform field operation tests.	V	—	W

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FIRE PROTECTION ENGINEERING ROLES and RESPONSIBILITIES

System	Sub-Systems	Phase	Elements	FP QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
All Systems	Required Submittals		QC Plan	—	A	S
			Performance Verification Plan	—	A	S
		Test Prep & Preliminary Certifications	Field Visit/Construction Surveillance Reports	—	S	QA
		Final Test Reports &	Final Acceptance Test Reports	A	S	QA or A
			Final Life Safety/Fire Protection Certification	—	S	A
Sprinkler Systems	Wet Pipe Sprinkler Systems	Test Preparation	Process/review system submittal (Qualifications of Installer, Shop Drawings, Data Sheets & Calcs)	A	C	S
			Process/review Preliminary Test Reports & Certifications	—	RA	S
			Witness hydrostatic test.	A	C	—
			Witness flush test.	V	W	—
			Visually inspect system for adherence to plan, completeness, and adequacy of installation.	A	QA	QA
			Visually inspect pipe pentrations	A	QA	QA
			Visually inspect sprinklers for location and that they are not painted / taped.	A	QA	QA
			Visually inspect seismic bracing	A	C	QA
			Operate control valves {Other than main service entrance riser}	A	C	QA
			Visually inspect check valve installation	A	C	QA
			Visually inspect test/drain discharge locations	A	C	QA
			Witness backflow preventer forward-flow test (NFPA 13, §16.2.5).	V	W	W
			Inspect/test alarm valve assembly and water service entrance(pipe sleeves, thrust rods, etc.), including valves, flow switch & tamper switches)	V	C	W
			Inspect/test flow control valve assembly	V	C	W
	Additional requirements for Dry Pipe, Preaction - Deluge		Process system submittal (Qualifications of Installer, Shop Drawings, Data Sheets & Calcs)	A	C	S
			Preliminary Test Reports & Certifications	—	RA	S
			Witness hydrostatic test.	A	C	—
			Witness flush test.	V	W	—
		Final Test	Verify Low-point drains are provided	V	—	QA
			Visually inspect air supply and piping	A	S	QA
			Witness backflow preventer test.	V	W	W
			Test high-low pressure air switch operation	V	—	W
			Inspect/Test deluge or dry valve riser assembly (including control valves, alarm switch & tamper switches), and functional operation	A	S	W
			Inspect/test detection and releasing system	See Fire Alarm System		

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FIRE PROTECTION ENGINEERING ROLES and RESPONSIBILITIES

System	Sub-Systems	Phase	Elements	FP QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
Water Distribution	**Fire hydrants, distribution piping, & control valves**	Final Test	Process system submittal (Qualifications of Installer, Shop Drawings, Data Sheets & Calcs)	A	C	—
			Preliminary Test Reports & Certifications	—	RA	S
			Visually inspect all thrust blocks.	A	QA	—
			Witness hydrostatic test.	A	C	—
			Witness flush testing of hydrant	A	C	QA
			Operate all control/isolation valves (each)	V	S	QA
			Operate fire hydrants and check for proper drainage (each)	V	S	QA
	Water storage	Construction	Preliminary Test Reports & Certifications	—	RA	S
			Verify suction piping w/in tank is installed in accordance with design	A	C	S
Pumps for Fire Protection (Water & Foam)	**Pumps & Controllers**	Test Preparation	Process system submittal (Qualifications of Installer, Shop Drawings, Data Sheets & Calcs)	A	C	S
			Preliminary Test Reports & Certifications	—	RA	S
			Visually inspect system for adherence to plan, completeness, and adequacy of installation.	A	QA	QA
		Test Preparation	Witness pump controller functional tests (including automatic transfer switch operation & battery transfer as applicable).	A	QA	W
			Witness flow test to generate performance curve (pressure vs discharge, rpms, amps, shaft alignment)	V	QA	W
		Final Test	Witness automatic and manual starts & stops	V	QA	W
			Verify that controller supervisory signals are received by the fire alarm control panel	V	C	W

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FIRE PROTECTION ENGINEERING ROLES and RESPONSIBILITIES

System	Sub-Systems	Phase	Elements	FP QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
Fire Alarm Systems	**Evacuation / Notification Detection & Releasing Systems.**	Test Preparation & Final Test	Process system submittal (Qualifications of Installer, Shop Drawings, Data Sheets & Calcs)	A	C	S
			Preliminary Test Reports & Certifications	—	RA	S
			Visually inspect system for adherence to plan, completeness, and adequacy of installation. (30,000 SQ. FT.)	A	QA	QA
			Test initiating devices for proper operation. (Activate 15% of smoke or heat detectors with no failures {30,000 sq. ft)/(625 sq. ft/ detector)(0.15)=7}	A	QA	QA
			Test initiating circuits for shorts, ground faults, and general operation	A	C	QA
			Test signaling circuits for shorts, ground faults, and general operation	A	C	QA
			Verify audible and visual devices operate properly and audible devices can be heard throughout the facility	A	C	QA
			Test peripheral devices (door hold opens, etc)	A	C	QA
			Witness functional test of the main control panel	V	C	W
			Test interface with other systems (i.e., preaction, gaseous, etc.)	V	C	W
			Test that correct signals are being sent to the base receiving station	V	C	W
			Test recall for elevators - See "Others - Elevators" {Bldg 2 stories or more}	V	S	W
			Test AHU shut down - See "Others - HVAC"	V	S	W
			Test power shut down - See "Others - {Elevators} Electrical"	V	C	W
	Control Panels used for Releasing Service		Process system submittal (Qualifications of Installer, Shop Drawings, Data Sheets & Calcs)	A	C	S
			Preliminary Test Reports & Certifications	—	RA	S
			Test releasing circuits for shorts, ground faults, and general operation	V	C	W
			Test power shut down - See "Others - Electrical"	V	S	QA
			Test automatic closing of dampers/doors	V	S	W
	Base-Wide Fire Reporting System		Process system submittal (Qualifications of Installer, Shop Drawings, Data Sheets & Calcs)	A	C	S
			Preliminary Test Reports & Certifications	—	RA	S
			Test transmitting devices to ensure the signals are received at the main console **{per bldg}**	V	C	W
			Test the main console for redundancy requirements	V	S	W

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FIRE PROTECTION ENGINEERING ROLES and RESPONSIBILITIES

System	Sub-Systems	Phase	Elements	FP QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
Miscelaneous Extinguishing Systems	Gaseous Systems	Final Test	Process system submittal (Qualifications of Installer, Shop Drawings, Data Sheets & Calcs)	A	C	S
			Preliminary Test Reports & Certifications	—	RA	S
			Visually inspect system for adherence to plan, completeness, and adequacy of installation.	A	S	QA
			Verify correct nozzles were installed	A	S	W
			Witness room pressurization test	V	S	W
			Witness full functional test to verify cylinder head functions properly and all control/interface functions operate accordingly.	V	S	W
			Inspect/test detection and releasing system	See Fire Alarm System		
	Wet Chemical & Dry Chemical Systems	Test Prep	Process system submittal (Qualifications of Installer, Shop Drawings, Data Sheets & Calcs)	A	C	S
			Preliminary Test Reports & Certifications	—	RA	S
			Verify piping and nozzles are installed in accordance with manufacturer's listing requirements	A	S	W
			Witness discharge test - ensure nozzles are bagged if discharging water in a wet chemical system	V	S	W
		Final Test	Verify alarm and supervisory signals are sent to the FACP	V	S	W
			Verify power and gas are disconnect when system activates (if applicable)	V	S	W
			Verify exhaust system either continues to run or shuts down depending on listing (if applicable)	V	S	W
	Foam Systems (All types)	Test Preparation	Process system submittal (Qualifications of Installer, Shop Drawings, Data Sheets & Calcs)	A	C	S
			Preliminary Test Reports & Certifications	—	RA	S
			Review test plan	—	C	QA
			Review the contractor's test plan for environmental and other compliance	—	S	QA
			Inspect/test detection and releasing system	See Fire Alarm System		
			Visually inspect system for adherence to plan, completeness, and adequacy of installation. Conduct functional test of entire system. Submit report.	A	QA	QA
			Verify correct foam generators / discharge devices are installed and properly piped	A	—	QA
			Verify correct size pipe and installed properly	A	—	QA
			Verify riser assembly (deluge valve) is installed properly	A	—	QA
		Final Test	Verify strainer has proper mesh	V	QA	W
		Final Test	Conduct performance test to ensure proper setting and operation of foam control valves and discharge devices. *(multiply by the number of risers)*	V	QA	W
			Conduct functional test of each generator, ratio controller, or proportioner. *(multiply by the number of risers)*	—	QA	W

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FIRE PROTECTION ENGINEERING ROLES and RESPONSIBILITIES

System	Sub-Systems	Phase	Elements	FP QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
Passive	Fire / Smoke Barriers IBC Inspections (Section 109)	Preliminary and Final Inspections	Process system submittal (Qualifications of Installer, Shop Drawings, Data Sheets & Calcs)	A	C	S
			Preliminary Test Reports & Certifications	—	RA	S
			Inspect Lath & gypsum board installation	A	QA	QA
			Inspect fire-rated / smoke wall and/or floor penetrations	A	S	QA
			Inspect wall/ceiling/roof joint	A	S	QA
			Inspect/test fire & smoke damper installation and performance	A	S	QA
			Inspect fire doors and frames	A	QA	QA
Life Safety Features	Exit Signs and Emergency Lighting	Preliminary	Verify installed locations of exit signs.	A	S	QA
			Verify installed locations of emergency lighting	A	S	QA
		Final Test	Check performance of emergency lighting systems and battery back-up.	A	S	QA
	Emergency Generators		Check to ensure all life safety features on the emergency generator are provide with power in the required amount of time	A	S	QA
Other Systems	Elevators	Test	Verify elevator re-call to primary floor	A	S	QA
			Verify elevator re-call to alternate floor	A	S	QA
			Test power disconnect upon water flow	V	S	QA
			Verify signal in elevator cab activates	V	S	QA
	Smoke Control / Exhaust Systems	Preliminary Test	Verify smoke exhaust / smoke control system activates via appropriate initiating devices (IBC §1704)	A	S	QA
			Verify location of duct detectors and for proper installation	A	S	QA
		Final Test	Perform operational test to show smoke exhaust / smoke control system functions as designed	V	S	QA
			Special Inspections for smoke control (IBC §1704) (See NFPA 92A & 92B, Chap. 8.)	A	W	W
			Perform operational test to verify detector functions properly and shuts down the correct AHU	V	S	QA
	Electrical	Pre-Test	Verify each detector associated with the electrical equipment disconnects power	A	S	QA
		Final Test	Test power disconnect for associated electronic equipment	V	S	QA

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MECHANICAL ENGINEERING ROLES and RESPONSIBILITIES

System	Sub-Systems	Phase	Elements	ME QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
Energy Supply Systems	**Fuel Oil - ALL**	Field Visit	**Complete System -** Verify contractor provided complete fuel oil system to the facility, including applications and permits	A	QA	—
			Piping - Verify fuel oil piping meets requirements of International Mechanical Code.	A	QA	—
			Testing - Verify oil system testing meets requirements of NFPA 31.	V	W	—
	Fuel Oil - Exterior	Submittal Process	**Piping -** Verify fuel piping is either ASTM A 53 Type E (electric-resistance welded, Grade A or B) black steel; or ASTM A 53 Type S (seamless, Grade A or B) black steel; or API SPEC 5L, seamless, submerged-arc weld or gas metal-arc weld, Grade B, black ste	A	RA	—
			Fuel Pumps - Verify fuel pumps comply with NEMA MG 1, NFPA 70, and are designed for use with hydrocarbon fuels.	A	RA	—
			Fuel Pumps - Verify fuel pumps have a working pressure of 1896 kilopascals (275 psig) at 38 degrees C (100 degrees F).	A	RA	—
			Fuel Meters - Verify fuel meters are continuous duty, positive displacement type, with electronic thermal compensation capability, suitable for outdoor installation.	A	RA	—
			Fuel Meters - Verify fuel meters are designed for use with hydrocarbon fuels and have a working pressure of 1896 kilopascals (275 psig) at 38 degrees C (100 degrees F).	A	RA	—
		Submittal Process/ Field Visit	**Storage Tanks -** Verify aboveground liquid fuel storage tanks are concrete encased or double wall in accordance with UL 142 and UL 2085 with secondary containment and leak monitoring of a capacity to meet the system requirements. Verify overfill/spill con	A	RA/ QA	S
			Dispensing Tanks - Verify Liquid fuel dispensing tanks are concrete encased or double wall in accordance with UL 142 and UL 2085 with secondary containment and leak monitoring of a capacity to meet the system requirements. Verify overfill/spill containme	A	RA/ QA	S
	Fuel Oil - Interior	Submittal Process	**Pumps -** Verify pumps that are not part of the burner assembly are positive dispacement type	A	RA	—
		Field Visit	**Oil Filter -** Verify an oil filter is provided prior to oil entering appliance or pump.	A	QA	QA
		Field Visit	**Drip Legs -** Verify drip legs are provided and properly installed prior to oil entering appliance or pump.	A	QA	—
		Submittal Process	**Storage Tanks -** Verify all storage tanks meet NFPA 31 requirements.	A	RA	—
	Natural Gas - ALL	Field Visit	**Complete System -** Verify contractor provided complete natural gas system to the facility, including applications and permits	A	QA	—
		Field Visit	**Testing -** Verify system was tested at 1.5 times maximum working pressure, but not less than 350 kPa (50 PSI) per NFPA 54	V	W	—

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MECHANICAL ENGINEERING ROLES and RESPONSIBILITIES

System	Sub-Systems	Phase	Elements	ME QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
Energy Supply Systems (continued)	**Natural Gas - Exterior (Contractor installed piping)**	Field Visit	**Piping -** Verify exterior gas piping meets requirements of local natural gas utility	A	QA	—
		Submittal Process	**Piping -** Verify piping meets requirements of ASME B31.8, Gas Transmission and Distribution Piping Systems	A	RA	—
		Submittal Process	**Piping -** Verify the natural gas piping is either ASTM A 53, Type E (electric-resistance welded, Grade A or B) black steel piping or ASTM A 53 Type S (seamless, Grade A or B) black steel piping or ASTM D 2513, Grade PE2406 or PE3408 polyethylene piping an	A	RA	—
		Field Visit	**Meter and Pressure Regulator -** Verify meter and pressure regulator are provided in accordance with local utility requirements.	A	QA	—
		Field Visit	**Piping Identification -** Verify polyethylene plastic tape manufactured specifically for warning and identifying buried utility lines are provided for non-metallic undergound piping systems	A	QA	—
	Natural Gas - Interior	Submittal Process	**Piping -** Verify interior gas piping meets requirements of NFPA 54, National Fuel Gas Code	A	RA	—
	Propane - ALL	Field Visit	**Complete System -** Verify contractor provided complete propane system to the facility, including appropriate applications and permits.	A	QA	—
	Propane - Exterior	Submittal Process	**Piping -** If piping is not provided by propane supplier, verify the propane piping is either ASTM A 53, Type E (electric-resistance welded, Grade A or B) black steel piping or ASTM A 53 Type S (seamless, Grade A or B) black steel piping or ASTM D 2513, Gr	A	RA	—
		Submittal Process	**Fittings -** Confirm Polyethylene fittings meet ASTM D 2683 for socket fittings or ASTM D 2513 for molded butt-fusion fittings	A	RA	—
		Field Visit	**Tank -** Verify propane tank capacity conforms to tank capacity submitted in shop drawings.	A	QA	—
		Submittal Process	**Tank -** If tank is not provided by propane supplier, verify propane tank material and installation comply with NFPA 58.	A	RA	—
		Submittal Process	**Tank -** If tank is not provided by propane supplier, verify propane tank is ASME labeled.	A	QA	—
		Field Visit	**Piping Identiication -** Verify polyethylene plastic tape manufactured specifically for warning and identifying buried utility lines are provided for non-metallic undergound piping systems	A	QA	—

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MECHANICAL ENGINEERING ROLES and RESPONSIBILITIES

System	Sub-Systems	Phase	Elements	ME QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
Energy Supply Systems (continued)	**Propane - Interior**	Field Visit	Verify the propane installation meets the requirements specified in NFPA 58.	A	QA	—
		Submittal Process	**Piping -** Verify standard pipe dimension ratio is not more than 11.5	A	RA	—
	Steam - Exterior Underground	Submittal Process	Confirm the submission of a Certificate of Satisfactory Operation certifying that at least 3 systems installed by the piping system manufacturer within the previous 10 years have and are operating satisfactorily for not less than 5 years.	A	RA	S
		Submittal Process	Confirm the submission of a written certification by the piping system manufacturer that the distribution system installer is technically qualified and experienced in the installation of the system.	A	RA	S
		Submittal Process/ Field Visit	Verify underground steam and condensate piping in separate conduits is direct buried, factory pre-fabricated, pre-insulated, and consist of a steel service pipe with polyurethane insulation and a high-density polyethylene (HDPE) jacket.	A	RA/ QA	—
		Submittal Process/ Field Visit	Confirm piping system fittings and components are factory fabricated and no field insulated fittings are provided.	A	RA/ QA	—
		Field Visit	Verify asbestos cement or plastic conduit piping is not provided.	A	QA	—
		Field Visit	**Piping Insulation -** Verify the piping system insulation thickness is in accordance with contract requirements.	A	QA	—
		Submittal Process	**Isolation Valves -** Verify ASME class 150 isolation valves are provided in manholes for system supply and return lines at take-offs for service to each building .	A	QA	—
		Submittal Process/ Field Visit	**Expansion Loops -** Verify expansion loops are utilized to compensate for piping expansion.	A	RA/ QA	S
		Submittal Process/ Field Visit	**Expansion Anchors -** Verify piping expansion anchors are located outside manholes.	A	RA/ QA	—
		Field Visit	**Manholes -** Verify system manholes are constructed of reinforced, 206.8 bar (3000 psi) concrete. Verify manhole floor and sides are watertight and were made in one monolithic pour. Verify manhole top extends a minimum of 300 mm (6 inches) above grade. V	A	QA	—
		Submittal Process	Verify a sump pit and a vertical sump pump designed for an operating temperature design of 93 degrees C (195 degrees F) minimum are provided in each system manhole.	A	RA	—
		Submittal Process	**Sump Pump - Float Control -** Verify a 2-pole float control is provided for each manhole sump pump.	A	RA	—
		Submittal Process/ Field Visit	**Valves -** For system valves located outside of manholes, verify a cast-iron or ductile-iron valve box and cover of a suitable size are provided. Verify the box cover has the word(s) describing the utility cast on the cover.	A	RA/ QA	—

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MECHANICAL ENGINEERING ROLES and RESPONSIBILITIES

System	Sub-Systems	Phase	Elements	ME QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
Energy Supply Systems (continued)	**Steam - Exterior Aboveground**	Submittal Process	**Piping -** Verify steam piping is either ASTM A 53 Type E (electric-resistance welded, Grade A or B) black steel pipe or ASTM A 53 Type S (seamless, Grade A or B) black steel pipe or, for pipe sizes through 250 mm (9 inches), ASTM A 106 (Grade A or B) black	A	RA	—
		Submittal Process	**Piping -** Verify condensate piping is either ASTM A 53 Type E (electric-resistance welded, Grade A or B) black steel, Weight Class XS (Extra Strong); or ASTM A 53 Type S (seamless, Grade A or B) black steel, Weight Class XS (Extra Strong); or ASTM A 106, G	A	RA	—
		Field Visit	**Piping Insulation -** Verify piping insulation is either fibrous glass, calcium silicate, or cellular glass as indicated in submitted shop drawings. Verify pipe insulation matches existing or surrounding insulation if applicable.	A	QA	—
		Field Visit	**Piping Insulation -** Verify the piping system insulation thickness is in accordance with contract requirements.	A	QA	—
		Field Visit	**Insulation -** Verify insulation is covered with an with aluminum jacket painted to conform with the Base Architectural Plan.	A	QA	—
		Submittal Process/ Field Visit	Verify the use of either MSS SP-58 or MSS SP-69 adjustable supports with insulation protection saddles. Verify roller supports utilize stainless steel axles.	A	RA/ QA	—
		Field Visit	**Support Poles -** Verify support poles are installed with guy wires and necessary hardware.	A	QA	—
		Submittal Process/ Field Visit	**Pipe Expansion -** Verify pipe expansion is compensated by utilizing either expansion loops, guided sliexpansion joints, or flexible ball type expansion joints.	A	RA/ QA	S
	Steam - Interior	Submittal Process	**Steam piping** - Verify is ASTM A106 or A53, Grade B, Schedule 40, black steel, electric-resistance welded or seamless	A	RA	—
		Submittal Process/ Field Visit	**Steam piping** - Verify insulated with mineral fiber or cellular glass insulation with all-purpose jacket	A	RA/ QA	—
		Submittal Process	**Condensate return piping** - Verify is ASTM A106 or ASTM A53, Grade B, Schedule 80, black steel, electric-resistance welded or seamless	A	RA	—
		Submittal Process/ Field Visit	**Condensate return piping** - Verify insulated with mineral fiber or cellular glass insulation with all-purpose jacket	A	RA/ QA	—
		Submittal Process	**Steel pipe fittings** - For piping 50 mm (2 inch) and smaller, verify is ANSI/ASME B16.3 malleable iron screwed fittings or ASME B16.11 socket welding (Class 3000) or ASME B16.11 threaded type (Class 2000)	A	RA	—
		Submittal Process	**Steel pipe fittings** - For piping 63 mm (2-1/2 inch) and larger, verify is ANSI/ASME B16.9 butt-welding fittings or ANSI/ASME B16.5 flanged type	A	RA	—
		Field Visit	**Steam pressure reducing station -** Verify provided for each building	A	QA	—

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MECHANICAL ENGINEERING ROLES and RESPONSIBILITIES

System	Sub-Systems	Phase	Elements	ME QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
nergy Supply Systems (continued)		Submittal Process/ Field Visit	**Steam traps** - Verify steam traps and accessories are in accordance with UFC 3-400-10N	A	RA/ QA	—
		Field Visit	Verify all valves, traps, and PRV's are accessible for service & maintenance	A	QA	—
	Hot Water - Exterior Underground	Submittal Process/ Field Visit	**Piping -** Verify underground hot water supply & return piping in separate conduits is direct buried, factory pre-fabricated, pre-insulated, and consist of a steel service pipe with polyurethane insulation and a high-density polyethylene (HDPE) jacket.	A	RA/ QA	—
		Submittal Process/ Field Visit	Confirm piping system fittings and components are factory fabricated and no field insulated fittings are provided.	A	RA/ QA	—
		Field Visit	Verify asbestos cement or plastic conduit piping is not provided.	A	QA	—
		Submittal Process	The UHDS representative shall 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	A	QA	S
		Field Visit	**Piping Insulation -** Verify the piping system insulation thickness is in accordance with contract requirements.	A	QA	—
		Submittal Process/ Field Visit	**Isolation Valves -** Verify ASME class 150 isolation valves are provided in manholes for system supply and return lines at take-offs for service to each building .	A	RA/ QA	—
		Submittal Process/ Field Visit	**Expansion Loops -** Verify expansion loops are utilized to compensate for piping expansion.	A	RA/ QA	S
		Submittal Process/ Field Visit	**Manholes -** Verify system manholes are constructed of reinforced, 206.8 bar (3000 psi) concrete. Verify manhole floor and sides are watertight and were made in one monolithic pour. Verify manhole top extends a minimum of 300 mm (6 inches) above grade. V	A	RA/ QA	—
		Submittal Process	Verify a sump pit and a vertical sump pump designed for an operating temperature design of 93 degrees C (195 degrees F) minimum are provided in each system manhole.	A	RA	—
		Submittal Process	**Sump Pump - Float Control -** Verify a 2-pole float control is provided for each manhole sump pump.	A	RA	—
		Submittal Process/ Field Visit	**Valves -** For system valves located outside of manholes, verify a cast-iron or ductile-iron valve box and cover of a suitable size are provided. Verify the box cover has the word(s) describing the utility cast on the cover.	A	RA/ QA	—

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MECHANICAL ENGINEERING ROLES and RESPONSIBILITIES

System	Sub-Systems	Phase	Elements	ME QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
En	**Hot Water - Exterior Aboveground**	Submittal Process	**Piping -** Verify hot water piping is either ASTM A 53 Type E (electric-resistance welded, Grade A or B) black steel, Weight Class XS (Extra Strong); or ASTM A 53 Type S (seamless, Grade A or B) black steel, Weight Class XS (Extra Strong); or ASTM A 106, Gr	A	RA	—
		Field Visit	**Piping Insulation -** Verify piping insulation is either fibrous glass, calcium silicate, or cellular glass as indicated in submitted shop drawings.	A	QA	—
		Field Visit	**Piping Insulation -** Verify the piping system insulation thickness is in accordance with contract requirements.	A	QA	—
		Field Visit	**Insulation -** Verify insulation is covered with an with aluminum jacket painted to conform with the Base Architectural Plan.	A	QA	—
		Submittal Process/ Field Visit	**Pipe Expansion -** Verify pipe expansion is compensated by utilizing either expansion loops, guided slip expansion joints, or flexible ball type expansion joints.	A	RA/ QA	S
		Submittal Process/ Field Visit	Verify the use of either MSS SP-58 or MSS SP-69 adjustable supports with insulation protection saddles. Verify roller supports utilize stainless steel axles.	A	RA/ QA	—
		Field Visit	**Support Poles -** Verify support poles are installed with guy wires and necessary hardware.	A	QA	—
	Hot Water - Interior	Submittal Process	**Piping** - Verify hot water piping is electric resistance, welded or seamless, schedule 40, black steel pipe conforming to ASTM A53. Piping 100mm (4 inch) and smaller may be ASTM B 88 Type K or L copper.	A	RA	—
		Submittal Process	**Steel fittings** - **For piping 50mm (2 inch) and smaller**, verify provided ANSI/ASME B16.3 malleable iron screwed fittings **OR** ASME B16.11 socket welding (Class 3000) fittings OR ASME B16.11 threaded type (Class 2000)	A	RA	—
		Submittal Process	**Steel fittings** - **For piping 63 mm (2-1/2 inch) and larger**, verify provided ANSI/ASME B16.9 butt-welding fittings **OR** ANSI/ASME B16.5 flanged type	A	RA	—
		Submittal Process	**Copper fittings -** Verify ANSI B16.18 cast bronze solder joint type or ASME/ANSI B16.22 wrought copper solder joint type	A	RA	—

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MECHANICAL ENGINEERING ROLES and RESPONSIBILITIES

System	Sub-Systems	Phase	Elements	ME QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
Energy Supply Systems (continued)		Submittal Process/ Field Visit	**Insulation -** Verify hot water piping insulated with mineral fiber insulation with factory-applied all-purpose jacket	A	RA/ QA	—
		Field Visit	**Isolation valves** - Verify equipment provided with isolation valves for service and repairs	A	QA	—
		Submittal Process/ Field Visit	**Valves -** Verify appropriately sized	A	RA/ QA	—
		Submittal Process/ Field Visit	**Balancing valves -** Verify provided and appropriately sized to balance water flow	A	RA/ QA	QA
		Field Visit	**Appurtenances -** Verify provided (such as air separators, expansion tanks, suction diffusers, strainers, etc)	A	QA	—
		Field Visit	**Test ports -** Verify provided in piping at inlet and outlet of all major system components including boilers, pumps, etc)	A	QA	QA
		Field Visit	Verify all valves and test ports are accessible for service and maintenance	A	QA	—
	Chilled Water & Condenser Water - Exterior Underground	Submittal Process	Verify system provided is direct buried, factory-prefabricated, pre-insulated, chilled water piping systems. Verify all fittings and accessories are designed and factory-fabricated to prevent moisture from entering into the system by manufacturer.	A	RA	S
		Field Visit	Verify backfill and overall installation meets the requirements of the piping system manufacturer.	A	QA	—
		Field Visit	**Isolation Valves -** Verify supply and return line isolation valves are provided at take-offs for service to each building in valve boxes.	A	QA	—
		Submittal Process/ Field Visit	Verify expansion loops are provided to compensate for piping expansion. Verify anchors are provided outside manholes.	A	RA/ QA	S
	Chilled Water & Condenser Water - Exterior Aboveground	Submittal Process	**Piping -** Verify chilled and condenser water piping are either electric resistance welded or seamless Schedule 40 black steel pipe conforming to ASTM A 53 or, for piping 100 mm (4 inch) and smaller, ASTM B 88 Type K or L copper.	A	RA	—
		Submittal Process	If steel piping is used, verify for piping 50 mm (2 inch) and smaller, ANSI/ASME B16.3 malleable iron screwed fittings or ASME B16.11 socket welding (Class 3000) or threaded type (Class 2000) fittings are provided. For piping 63 mm (2-1/2 inch) and large	A	RA	—
		Submittal Process	If copper piping is used, verify ANSI B16.18 cast bronze solder joint fittings or ASME/ANSI B16.22 wrought copper solder joint fittings are provided.	A	RA	—
		Submittal Process/ Field Visit	**Piping Insulation -** Verify piping insulation is either Mineral fiber, Urethane, cellular glass, Faced Phenolic Foam, or Flexible Cellular pipe insulation as indicated in submitted shop drawings.	A	RA/ QA	—

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MECHANICAL ENGINEERING ROLES and RESPONSIBILITIES

System	Sub-Systems	Phase	Elements	ME QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
Energy Supply Systems (continued)		Field Visit	**Piping Insulation -** Verify the piping system insulation thickness is in accordance with contract requirements.	A	QA	—
		Field Visit	**Piping Insulation -** Verify piping insulation is covered with an aluminum jacket.	A	QA	—
		Submittal Process/ Field Visit	Verify the use of either MSS SP-58 or MSS SP-69 adjustable supports with insulation protection saddles. Verify roller supports utilize stainless steel axles.	A	RA/ QA	—
		Field Visit	**Support Poles -** Verify support poles are installed with guy wires and necessary hardware.	A	QA	—
		Submittal Process/ Field Visit	**Pipe Expansion -** Verify pipe expansion is compensated by utilizing either expansion loops, guided slip expansion joints, or flexible ball type expansion joints.	A	RA/ QA	S
	Chilled Water & Condenser Water - Interior	Submittal Process	**Aboveground chilled & condenser water piping -** Verify aboveground chilled water piping is electric resistance welded or seamless schedule 40 black steel pipe conforming to ASTM A 53. Piping 100mm (4 inch) and smaller may be ASTM B 88 Type K or L copper.	A	RA	—
		Submittal Process	**Steel pipe fittings - For piping 50mm (2 inch) and smaller -** Verify provided ANSI/ASME B16.3 malleable iron screwed fittings or ASME B16.11 socket welding (Class 3000) or threaded type (Class 2000).	A	RA	—
		Submittal Process	**Steel pipe fittings - For piping 63mm (2-1/2 inch) and larger -** Verify provided ASME/ANSI B16.9 butt-welding fittings or ASME/ANSI B16.5 flanged type.	A	RA	—
		Submittal Process	**Steel pipe fittings -** Grooved joint pipe coupling systems of appropriate pressure rating are acceptable in lieu of welded or screwed fittings	A	RA	—
		Submittal Process	**Copper fittings -** Verify provided ANSI B16.18 cast bronze solder joint type or ASME/ANSI B16.22 wrought copper solder joint type	A	RA	—
		Field Visit	**Isolation valves -** Verify isolation valves provided on supply and return lines at take-offs for service to each building	A	QA	—
		Field Visit	**Isolation valves -** Verify isolation valves located in valve boxes	A	QA	—
		Submittal Process/ Field Visit	**Insulation -** Verify above-ground chilled water piping insulated with cellular glass insulation. Flexible unicellular insulation may be used on small piping runouts.	A	RA/ QA	—
		Submittal Process/ Field Visit	**Insulation -** Verify above-ground condenser water piping insulated with mineral fiber insulation	A	RA/ QA	—
		Submittal Process/ Field Visit	**Insulation -** Verify all-purpose jacket with vapor retarder provided for above-ground chilled water and condenser piping	A	RA/ QA	—
		Submittal Process/ Field Visit	**Valves -** Verify appropriately sized	A	RA/ QA	—

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MECHANICAL ENGINEERING ROLES and RESPONSIBILITIES

System	Sub-Systems	Phase	Elements	ME QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
Energy Supply Systems (conti		Submittal Process/ Field Visit	**Balancing valves -** Verify provided and appropriately sized to balance water flow	A	RA/ QA	QA
		Submittal Process/ Field Visit	**Relief valves -** Verify provided and appropriately sized	A	RA/ QA	—
		Field Visit	**Test ports -** Verify test ports provided inpiping at inlet and outlet of all major system components including chillers, pumps, etc	A	QA	QA
		Field Visit	Verify all valves and test ports are accessible for service and maintenance	A	QA	—
	AHU's - ALL	Field Visit	**DDC Sensors -** Confirm location of DDC sensors (temp, SP, Freeze, High pressure SP, AFM), if required	A	QA	QA
		Field Visit	**Smoke Detectors -** Confirm location of smoke detectors (if over 2000 cfm)	A	QA	QA
		Field Visit	**Testing - Filters -** Confirm filters are clean prior to testing	A	QA	QA
		Field Visit	**Filters -** Confirm filters are installed	—	—	—
		Field Visit	**Belts -** Confirm belt tightness and alignment	A	QA	QA
		Field Visit	**Coils -** Confirm all coils are clean	A	QA	QA
		Field Visit	**Vibration Isolators -** Confirm vibration isolators installed according to contract docs and unit secured	A	QA	QA
		Field Visit	**Damper -** Confirm damper operation and assembly tightness	A	QA	QA
		Field Visit	**Motor -** Confirm motor size (HP), voltage, amperage, and rpm	A	QA	QA
		Submittal Process	**Fans -** Verify provided have AMCA 210 certified fans with AMCA seal	A	QA	—
		Field Visit	**Fans -** Confirm fan rpm and rotation direction	A	QA	QA
		Field Visit	**OA Intake Plenum -** Confirm OA intake plenum configuration provides for drainage	A	QA	QA
		Field Visit	**AFM -** Confirm air flow monitoring station location in conformance with manufacturer requirements	A	QA	QA
		Field Visit	**Size -** Confirm unit matches schedule req	A	QA	QA
		Submittal Process/ Field Visit	**Fan bearings -** Verify fan bearings were greased (if req) and have min average life of 200,000 hours at design operating conditions	A	RA/ QA	—
		Field Visit	**Birdscreens -** Verify birdscreens provided for outdoor inlets and outlets	A	QA	QA
		Field Visit	Verify all filter and access doors are accessible for service and maintenance	A	QA	—
		Field Visit	Verify provided are modular construction, double wall AHU's with min of 25mm (1 inch) casing insulation	A	QA	—
		Submittal Process	Verify provided have ARI 430 certified fans and ARI certified coils	A	RA	—

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MECHANICAL ENGINEERING ROLES and RESPONSIBILITIES

System	Sub-Systems	Phase	Elements	ME QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
Equipment & Components (continued)		Submittal Process/ Field Visit	**Drain pan -** Verify provided has stainless steel, positive draining condensate drain pan	A	RA/ QA	—
		Submittal Process	**For 100% OA units -** Verify capability provided for cooling, heating, dehumidification, and reheat	A	RA	—
		Submittal Process/ Field Visit	**Ultraviolet disinfection system -** Verify central station ahu's provided with an ultraviolet c-band (UVC) disinfection system for mold, bacteria, and odor control in each air handler that has a chilled water or DX cooling coil	A	RA/ QA	—
		Submittal Process/ Field Visit	**Ultraviolet disinfection system -** Verify irradiation emitters and fixtures installed in sufficient quantity and in such an arrangement so as to provide an equal distribution of UVC energy on the coil and in the drain pan	A	RA/ QA	—
		Submittal Process/ Field Visit	**Ultraviolet disinfection system -** Verify the UVC energy produced has the lowest possible reflected and shadowed losses (To maintain energy efficiency)	A	RA/ QA	—
		Submittal Process/ Field Visit	**Ultraviolet disinfection system -** For energy efficiency, verify power supplies are of the high efficiency electronic type and matched to the emitter	A	RA/ QA	—
		Submittal Process/ Field Visit	**Ultraviolet disinfection system -** For intensity, verify the minimal UVC energy striking the leading edge (if nstalled upstream) or trailing edge (if installed downstream) of all the coil fins is not less than 820 uW/cm2 at the closest point and through pl	A	RA/ QA	—
		Submittal Process/ Field Visit	**Ultraviolet disinfection system -** Verify equal amounts strike the drain pan, either directly or indirectly through reflection	A	RA/ QA	—
		Submittal Process/ Field Visit	**Ultraviolet disinfection system -** For installation, verify emitters and fixtures are installed at right angles to the conforming lines of the coil fins, such that through incident angle reflection, UVC energy bathes all surfaces of the coil and drain pan	A	RA/ QA	—
		Submittal Process/ Field Visit	**Ultraviolet disinfection system -** Verify one complete set of spare bulbs supplied	A	RA/ QA	—
	AHU's - Split System	Submittal Process	Verify provided is factory assembled, packaged AHU rated in accordance with ARI 210/240 or ARI 340/360	A	RA	—
		Field Visit	Verify matching components provided are from the same manufacturer	A	QA	—
	AHU's - Rooftop	Submittal Process/ Field Visit	Verify provided is factory packaged unit in accordance with ARI 430 and suitable for outdoor installation	A	RA/ QA	—
		Field Visit	**Roof Curb -** Verify provided with manufacturer's roof curb	A	QA	—

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MECHANICAL ENGINEERING ROLES and RESPONSIBILITIES

System	Sub-Systems	Phase	Elements	ME QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
nent & Components (continued)	**Roof Curbs**	Field Visit	**Mounting Surface -** Confirm fan or unit mounting surface is parallel to the horizon, not the roof deck if sloped	A	QA	—
		Field Visit	**Waterproofing -** Confirm curb has been flashed properly and seal to the roofing material (no leaks) (waterproofing)	A	QA	—
		Field Visit	**Lightning Rods -** Confirm lightning rods have been attached to units and run to ground	A	QA	—
		Field Visit	**Insulation -** Confirm roof curb is insulated	A	QA	—
		Field Visit	**Size -** Confirm curb is the same size or smaller as the unit being placed on it (tight fit)	A	QA	—
	Fans - ALL	Submittal Process/ Field Visit	Verify fans are AMCA 210 certified with AMCA seal	A	RA/ QA	—
		Submittal Process	**Fan bearings -** Verify fan bearings have min average life of 200,000 hours at design operating conditions	A	RA	—
		Field Visit	**Rotation -** Confirm rotation and alignment	A	QA	QA
		Field Visit	**Belts -** Confirm belt tightness (if provided)	A	QA	QA
		Field Visit	**Motor -** Confirm HP, voltage, amperage	A	QA	QA
		Field Visit	**Size -** Confirm size matches schedule req	A	QA	QA
		Field Visit	Verify fans are accessible for service and maintenance	A	QA	
		Field Visit	**Birdscreens -** Verify bird screens provided for outdoor inlets and outlets	A	QA	QA
		Field Visit	**DDC -** Verify fans provided with means for verifying operation via DDC system	A	QA	QA
	Exhaust Fans (Roof)	Field Visit	**Roof Curb -** Confirm lag bolted to roof curb	A	QA	QA
		Field Visit	**Dome Top -** Confirm dome top is secured	A	QA	QA
		Field Visit	**Type -** Verify centrifugal fans provided	A	QA	
	In-line Fans	Field Visit	**Vibration Isolators -** Confirm hangers & isolation devices	A	QA	QA
		Field Visit	**Flex Connection -** Confirm flexible connection to ductwork	A	QA	QA
		Field Visit	**Speed Controller -** Confirm speed controller installation (if provided)	A	QA	QA
		Field Visit	**Access Panel -** Confirm access panel located properly	A	QA	QA
		Field Visit	**Type -** Verify centrifugal fans provided	A	QA	—
	Wall Fans	Field Visit	**Type -** Verify wall fans provided are propeller fans with fan guards	A	QA	—
		Field Visit	**Type -** Verify wall fans provided are centrifugal fans with backdraft dampers and wall bracket	A	QA	—
	Bathroom Fan	Submittal Process/ Field Visit	Verify provided are UL 507 and UL-Listed, Home Ventilating Institute (HVI) certified, and with AMCA seal for ceiling installation	A	RA/ QA	—

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MECHANICAL ENGINEERING ROLES and RESPONSIBILITIES

System	Sub-Systems	Phase	Elements	ME QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
Equipm	**Range Hoods**	Submittal Process/ Field Visit	Verify provided are UL 507 and UL-Listed, with AMCA seal	A	RA/ QA	—
		Submittal Process/ Field Visit	**Light -** Verify provided with light over stove	A	RA/ QA	—
		Submittal Process	Verify min fan capacity is 160 cfm with max sound level of 5.6 sones	A	RA	—
	Louvers & Hoods - ALL	Submittal Process	**Louver rating** - Verify louvers bear AMCA ratings seal for air performance and water penetration in accordance with AMCA 500 and AMCA 511	A	RA	—
		Submittal Process/ Field Visit	**Construction** - Verify hoods and louvers constructed of anodized aluminum alloy or stainless steel	A	RA/ QA	
		Submittal Process/ Field Visit	**Birdscreens** - Verify provided for louvers and hoods	A	RA/ QA	QA
	Intake Hood (Roof)	Submittal Process/ Field Visit	**Type -** Confirm type as specified	A	RA/ QA	QA
		Field Visit	Confirm top is secured	A	QA	QA
		Submittal Process/ Field Visit	**Size -** Confirm size matches schedule req (free area)	A	RA/ QA	QA
	OA Intake Louvers (Wall)	Submittal Process/ Field Visit	**Type -** Confirm type as specified	A	RA/ QA	QA
		Submittal Process/ Field Visit	**Size -** Confirm size matches schedule req (free area)	A	RA/ QA	QA
		Submittal Process/ Field Visit	Confirm waterproof (when req) and velocity when water carry-over occurs	A	RA/ QA	QA
		Field Visit	**Intake Plenum -** Confirm intake plenum is sloped back to louver or drain has been provided	A	QA	QA
		Field Visit	**Damper -** Confirm opposed blade damper with actuator has been provided	A	QA	QA
		Field Visit	**AFM -** Confirm air flow monitoring type louver has been provided, if req	A	QA	QA

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MECHANICAL ENGINEERING ROLES and RESPONSIBILITIES

System	Sub-Systems	Phase	Elements	ME QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
Equipment & Components (continued)	**Ductwork**	Field Visit	**Construction -** Except as specified herein, verify ductwork constructed, braced, reinforced, installed, supported, and sealed per SMACNA standards	A	QA	QA
		Field Visit	Verify all dampers are accessible for service and maintenance	A	QA	—
		Field Visit	Confirm general construction conforms to contract documents	A	QA	QA
		Field Visit	Confirm correct pressure rating of ductwork has been conformed to SMACNA	A	QA	QA
		Field Visit	Confirm ductwork has been sealed in accordance with specified seal class	A	QA	QA
		Field Visit	**VAV inlet -** Confirm minimum straight duct is 6 duct diameters and same size as VAV terminal inlet	A	QA	QA
		Field Visit	Confirm DALT allowables are met	A	QA	QA
		Submittal Process/ Field Visit	**Access Doors -** Confirm access doors have been provided before every elbow with turning vanes	A	RA/ QA	QA
		Submittal Process/ Field Visit	**Access Doors -** Confirm access doors provided at appropriate locations	A	RA/ QA	QA
		Field Visit	**Flexible duct** - Verify insulated flexible duct used only to adapt to minor offsets for connections to air distribution devices	A	QA	QA
		Submittal Process	**Flexible duct** - Verify is UL 181 listed and per SMACNA DCS with minimum R value of 4	A	RA	—
		Field Visit	**Flexible duct** - Verify maximum length is 2 meters (6 feet)	A	QA	QA
		Field Visit	**Flexible Duct -** Confirm, where flexible ductwork is specified, that the length of flex ductwork is provided to the max req length or less and is supported properly with no abrupt turns (ie: as straight as possible)	A	QA	QA
		Field Visit	**Flexible connectors** - Verify provided between fans and ducts	A	QA	QA
		Submittal Process/ Field Visit	**Damper -** Confirm balancing damper at branch take-off's, not at diffuser neck	A	RA/ QA	QA
		Submittal Process/ Field Visit	**Damper -** Confirm balancing damper construction conforms to the specified seal class	A	RA/ QA	QA
		Submittal Process/ Field Visit	**Damper -** Confirm discharge damper installed on VAV terminal discharge, if req	A	RA/ QA	QA
		Field Visit	**Damper -** Confirm control damper type and location along with actuator type	A	QA	QA
		Submittal Process	**Dampers** - Verify conforms to SMACNA DCS	A	RA	—
		Submittal Process	**Fire dampers** - Verify are rated per UL 555	A	RA	—
		Submittal Process	**Fire dampers** - Verify are dynamic type rated for closure against a moving airstream	A	RA	—

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System	Sub-Systems	Phase	Elements	ME QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
ent & Components (continued)		Submittal Process/ Field Visit	**Fire dampers** - Verify do not intrude into air stream when in open position	A	RA/ QA	—
		Submittal Process	**Smoke dampers** - Verify are rated per UL 555S	A	RA	—
		Submittal Process/ Field Visit	**Elbows -** Confirm correct elbow type (ie: double wall turning vane, 1.5 radius curved, etc)	A	RA/ QA	QA
		Field Visit	**Bracing -** Confirm proper bracing of high pressure ductwork in accordance with SMACNA	A	QA	QA
		Field Visit	**Filters -** Confirm access to filter rack for ease of filter change out in duct mounted assemblies	A	QA	QA
		Submittal Process/ Field Visit	**Insulation -** Confirm ductwork insulated properly (ext batt, hard, int lined, double wall insulated, etc)	A	RA/ QA	QA
		Field Visit	**Insulation -** Inspect vapor barrier of insulation	A	QA	—
		Field Visit	**Hangers -** Confirm proper duct hangers have been utilized in accordance with spec req	A	QA	QA
		Field Visit	**Vibration Isolators -** Confirm the use of vibration isolation material at unit connection to ductwork free of holes (no leakage)	A	QA	QA
		Submittal Process	**Sound attenuators** - Verify fabricated sound attenuators reduces 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 pow	A	RA	—
		Submittal Process/ Field Visit	**Sound attenuators** - Verify pressure drop does not exceed 157 Pa (0.63 inch of water)	A	RA/ QA	QA
	VAV Boxes - ALL	Submittal Process	Verify units are pressure-independent type and rated per ARI 880	A	QA	—
		Field Visit	**Primary air valve** - Verify not allowed to fully shut-off	A	QA	QA
		Field Visit	**Heating coil** - Verify each box provided with heating coil unless not required by space reheat or heating	A	QA	—
		Field Visit	Verify all VAV box control panels are accessible	A	QA	
		Field Visit	**Electronic controls** - Verify are provided	A	QA	QA
	VAV Terminal Box (Fan-Powered)	Submittal Process	**Type -** Verify units are pressure-independent, fan powered, rated per ARI 880, and UL listed	A	QA	—
		Field Visit	**Filters -** Confirm filter installed and clean	A	QA	QA
		Field Visit	Confirm ductwork on primary inlet is installed with 6 straight duct diameters the same size as the inlet	A	QA	QA
		Submittal Process/ Field Visit	**Dampers -** Confirm discharge damper has been provided and/or coordinated with sheet metal contractor	A	QA	QA
		Field Visit	Confirm fan size & primary inlet sized in accordance with contract documents	A	QA	—
		Field Visit	**Primary Air Valve -** Confirm max/min setting of primary air valve	A	QA	QA
		Field Visit	**Primary air valve** - Verify not allowed to fully shut-off	A	QA	QA

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System	Sub-Systems	Phase	Elements	ME QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
Equipment		Field Visit	**Size -** Confirm size matches schedule req	A	QA	QA
		Field Visit	**Motor -** Confirm HP, voltage, and amperage of fan motor	A	QA	QA
		Field Visit	**Heating coil** - Verify each box provided with heating coil, if required	A	QA	—
		Field Visit	**Reheat Coils -** Confirm reheat coil size, if req	A	QA	—
		Field Visit	**Reheat Coils -** Confirm reheat coil is piped properly	A	QA	QA
		Field Visit	**Sensors -** Confirm discharge temp sensor provided, if req	A	QA	QA
		Field Visit	Confirm hangers have provisions for vibration isolation	A	QA	QA
		Field Visit	**Electronic controls** - Verify provided with speed controller, discharge volume control damper(s), and return/recirculation air frame and filter	A	QA	QA
		Submittal Process	**Insulation** - Verify in accordance with ASHRAE 90.1	A	RA	—
	VAV Terminal Box (Shut Off)	Field Visit	Confirm ductwork on primary inlet is installed with 6 straight duct diameters the same size as the inlet	A	QA	QA
		Field Visit	**Primary Air Valve -** Confirm max and min setting of primary air valve	A	QA	QA
		Field Visit	**Reheat Coils -** Confirm reheat coil size, if req	A	QA	
		Field Visit	**Reheat Coils -** Confirm reheat coil in piping properly	A	QA	QA
		Field Visit	**Sensors -** Confirm discharge temp sensor provided, if req	A	QA	QA
		Field Visit	Confirm hangers have provisions for vibration isolation	A	QA	QA
		Field Visit	**Size -** Confirm box size matches schedule req	A	QA	QA
	DX VAV Units	Submittal Process	**Finish** - If indicated in ESR Section D30, verify anti-corrosion coating provided is immersion applied, baked phenolic, or other approved coating. Field applied coatings not acceptable.	A	QA	—
		Submittal Process/ Field Visit	**Direct expansion equipment** - Verify is specifically designed and manufactured for VAV applications	A	RA/ QA	—
		Submittal Process/ Field Visit	**Equipment** - Verify from the same manufacturer (central air handling units, VAV boxes/ zone dampers, and zone controls)	A	RA/ QA	—
		Field Visit	**Evaporator coils** - Verify airflow through evaporator coils is not modulated	A	QA	—
		Field Visit	**Zone control damper units** - Verify duct mounted zone control damper units provided with integral control box designed for use with DX VAV packaged systems	A	QA	—
		Submittal Process/ Field Visit	**Air diffusers** - Verify self-modulating air diffusers are not used	A	RA/ QA	—
	Condensing Units	Submittal Process/ Field Visit	**Finish** - If indicated in ESR Section D30, verify anti-corrosion coating provided is immersion applied, baked phenolic, or other approved coating. Field applied coatings not acceptable.	A	RA/ QA	—
		Submittal Process	**Air conditioner** - Verify air-cooled, split system air conditioner provided with ducted air distribution	A	QA	—

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MECHANICAL ENGINEERING ROLES and RESPONSIBILITIES

System	Sub-Systems	Phase	Elements	ME QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
Equipment & Components (continued)		Submittal Process	**Construction and rating** - Verify units are factory assembled, designed, tested, and rated in accordance with ARI 210/ 240 or ARI 340/ 360	A	QA	—
		Submittal Process/ Field Visit	**Clearance** - Verify manufacturer's minimum recommended clearance around condensing units is provided	A	RA/ QA	QA
		Field Visit	**Refrigerant piping size** - Verify is per manufacturer's recommendations	A	QA	—
	Heat Pumps - Ground Source	Submittal Process/ Field Visit	**Finish** - If indicated in ESR Section D30, verify anti-corrosion coating provided is immersion applied, baked phenolic, or other approved coating. Field applied coatings not acceptable.	A	RA/ QA	—
		Submittal Process	**Construction and rating** - Verify units are factory assembled, designed, tested, and rated in accordance with ARI 330	A	QA	—
		Submittal Process	**Heat exchanger** - Verify connected to heat exchanger by closed loop ground source vertical well field	A	RA	—
		Submittal Process/ Field Visit	**Well field** - Verify design and installation of each well field comply with IGSHPA and ASHRAE standards	A	RA/ QA	—
	Heat Pumps - Water Source	Submittal Process/ Field Visit	**Finish** - If indicated in ESR Section D30, verify anti-corrosion coating provided is immersion applied, baked phenolic, or other approved coating. Field applied coatings not acceptable.	A	RA/ QA	—
		Submittal Process	**Construction and rating** - Verify units are factory assembled, designed, tested, and rated in accordance with ARI 210/ 240 or ARI 340/ 360	A	QA	—
	Heat Pumps - Air to Air	Submittal Process/ Field Visit	**Finish** - If indicated in ESR Section D30, verify anti-corrosion coating provided is immersion applied, baked phenolic, or other approved coating. Field applied coatings not acceptable.	A	RA/ QA	—
		Submittal Process	**Heat pumps** - Verify air-cooled, split system heat pumps provided with ducted air distribution	A	RA/ QA	—
		Submittal Process	**Construction and rating** - Verify units are factory assembled, designed, tested, and rated in accordance with ARI 210/ 240 or ARI 340/ 360	A	QA	QA
		Field Visit	**Clearance** - Verify manufacturer's minimum recommended clearance around condensing units is provided	A	QA	—
		Field Visit	**Refrigerant piping size** - Verify is per manufacturer's recommendations	A	QA	QA
		Field Visit	**Insulation** - Verify provided for refrigerant piping suction lines and condensate drain	A	QA	—
	Condensate Return Units	Submittal Process/ Field Visit	Verify has floor-mounted receiver and duplex pump unit	A	RA/ QA	—

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MECHANICAL ENGINEERING ROLES and RESPONSIBILITIES

System	Sub-Systems	Phase	Elements	ME QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
Equipment & Components (continued)	**Equipment Thermal Insulation**	Submittal Process/ Field Visit	**Insulation** - Verify insulation provided for hot and chilled water pumps and equipment as suitable for the temperature and service fit as closely as possible to equipment. May be rigid block, semi-rigid board, or flexible unicellular insulation.	A	RA/ QA	QA
			Vapor retarder - Verify provided for chilled water applications	A	QA	—
	Auxilliary Equipment	Submittal Process/ Field Visit	**Steam-to-hot-water converter** - Verify provided as required for application	A	RA/ QA	—
		Submittal Process	**Heat exchangers** - Verify factory assembled u-tube units provided constructed in accordance with ASME BPVC for steam or hot water. For hot water, plate type heat exchangers may be provided.	A	RA	—
	Furnaces	Submittal Process/ Field Visit	**Construction** - Confirm provided furnace is UL-listed, factory assembled, self-contained, and forced circulation	A	RA/ QA	QA
		Submittal Process/ Field Visit	**Electronic ignition system** - Verify provided	A	RA/ QA	—
		Submittal Process/ Field Visit	**Gas furnace rating** - Confirm unit is design certified by AGA and GAMA efficiency rating certified for gas furnaces.	A	RA/ QA	—
		Submittal Process/ Field Visit	**Oil furnace rating** - Confirm unit meets requirements for NFPA 31 for oil furnaces.	A	RA/ QA	—
		Submittal Process/ Field Visit	**Cooling coil** - Verify provided, if necessary	A	RA/ QA	—
	Unit Ventilators	Submittal Process/ Field Visit	Verify unit is a factory assembled unit ventilator capable of up to 100% OA ventilation and UL-Listed	A	RA/ QA	—
	Unit Heaters	Submittal Process/ Field Visit	See D302004 for gas fired unit heaters	A	RA/ QA	—
	Unit Heaters-Steam	Submittal Process/ Field Visit	Verify provided is UL-Listed and factory assembled	A	RA/ QA	—
	Unit Heaters - Hot Water	Submittal Process/ Field Visit	Verify provided is UL-Listed and factory assembled	A	RA/ QA	—
	Unit Heaters - Cabinet	Submittal Process/ Field Visit	Verify provided is UL-Listed and factory assembled	A	RA/ QA	—

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MECHANICAL ENGINEERING ROLES and RESPONSIBILITIES

System	Sub-Systems	Phase	Elements	ME QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
	Fuel-Fired Unit Heaters - Gas	Submittal Process/ Field Visit	Verify meets requirements for ANSI Z83.8 and AGA label	A	RA/ QA	—
		Submittal Process/ Field Visit	**Discharge louver** - Verify each heater equipped with individually adjustable package discharge louver	A	RA/ QA	QA
		Submittal Process/ Field Visit	**Thermostat** - Verify provided	A	RA/ QA	QA
	Fuel-Fired Unit Heaters - Infrared	Submittal Process/ Field Visit	Verify meets requirements for ANSI Z83.8 and AGA label	A	RA/ QA	—
	Unit Heaters - Electric	Submittal Process/ Field Visit	Verify provided are factory assembled, UL-1025	A	RA/ QA	—
	Heaters - Baseboard	Submittal Process/ Field Visit	Verify provided are factory assembled, UL-1042	A	RA/ QA	—
	Heaters - Wall	Submittal Process/ Field Visit	Verify provided are factory assembled, UL-1025, cabinet heaters	A	RA/ QA	—
	Heaters - Infrared	Submittal Process/ Field Visit	Verify provided are factory assembled, UL-Listed and labeled heaters	A	RA/ QA	—
	Fin Tube Radiators & Convectors	Submittal Process	Verify fin tube radiators and convectors provided with copper tubes and aluminum fins	A	RA	—
		Submittal Process	**Control Valves -** Verify control valves provided are normally open, spring return	A	RA/ QA	QA
	Duct Heater	Submittal Process/ Field Visit	Verify provided is factory assembled, UL-Listed heater	A	RA/ QA	—
		Field Visit	Verify adequate duct length is provided per manufacturer's recommendations upstream & downstream	A	QA	—
		Submittal Process/ Field Visit	Verify control cabinet and heating coil provided	A	RA/ QA	—
	Pumps - ALL	Submittal Process/ Field Visit	Verify provided are centrifugal circulating pumps with motor, motor starter, and motor enclosure conforming to the appropriate NEMA standards	A	RA/ QA	—
		Field Visit	**Insulation -** Verify pumps used for hot service and chilled water service are insulated	A	QA	QA

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MECHANICAL ENGINEERING ROLES and RESPONSIBILITIES

System	Sub-Systems	Phase	Elements	ME QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
Equipment & Components (continued)	**Pumps - Base-mounted**	Field Visit	Confirm size and nameplate data matches schedule req	A	QA	QA
		Field Visit	Verify voltage service matches nameplate	A	QA	QA
		Field Visit	Verify provided are single-stage end suction pumps suitable for chilled, condenser, and hot water heating systems	A	QA	QA
		Field Visit	**Isolation Base -** Confirm isolation base is provided where req	A	QA	QA
		Field Visit	**Insulation -** Confirm insulation enclosure is provided where req	A	QA	QA
		Field Visit	Confirm pressure taps, gages, and shutoffs have been provided in the specified locations	A	QA	QA
		Field Visit	**Balancing Valves -** Confirm the balancing valves have been provided in accordance with manufacturers recommendations and/or in accordance with the appropriate contract document detail	A	QA	QA
		Field Visit	**Balancing Valves -** Confirm balancing valves provided with proper clearances	A	QA	QA
		Field Visit	**Rotation -** Verify rotation direction is correct	A	QA	QA
		Field Visit	**Suction diffusers -** Verify suction diffusers provided on base-mounted pumps	A	QA	QA
	Pumps - In-line	Field Visit	**Location -** Confirm location is correct(ie: in accordance with the contract documents)	A	QA	QA
		Field Visit	Verify constructed of manufacturer's standard materials suitable for chilled, condenser, and hot water heating systems	A	QA	QA
		Field Visit	Confirm voltage provided is correct	A	QA	QA
		Field Visit	**Valve Arrangement -** Confirm valve arrangement around the pump is correct	A	QA	QA
		Field Visit	**Balancing Valve -** Confirm balancing valve has been provided in accordance with the contract documents, if req	A	QA	QA
		Field Visit	**Balancing Valve -** Confirm balancing valves provided with proper clearances	A	QA	QA
	Diffusers, Registers, & Grilles	Field Visit	Confirm location, size, and type have been provided in accordance with the contract documents	A	QA	QA
		Field Visit	**Dampers -** Confirm branch balancing dampers have been provided and dampers, if any, provided with the air device are in the wide open position	A	QA	QA
		Field Visit	**Finish** - Verify are factory-finished	A	QA	—
		Field Visit	**Exterior and exposed edges** - Verify are rolled, or otherwise stiffened and rounded	A	QA	—
	Pipe Sleeves	Field Visit	Verify pipe sleeves provided at each wall and floor penetration	A	QA	—
		Field Visit	Verify sleeves are of a material suitable to protect the carrier pipe (2 pipe sizes larger) and sealed with an appropriate flexible material	A	QA	—

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MECHANICAL ENGINEERING ROLES and RESPONSIBILITIES

System	Sub-Systems	Phase	Elements	ME QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
Equipment & Components (continued)		Submittal Process/ Field Visit	**Fire Stopping -** In fire rated walls, verify fire stopping provided inaccordance with IBC	A	RA/ QA	—
	Piping Identification	Field Visit	Verify piping provided with identification labels or stencil names or code letters for piping systems in clearly visible letters and symbols	A	QA	—
		Field Visit	Verify arrow-shaped markings provided to indicate direction of flow	A	QA	QA
	Piping - Condensate Drain	Submittal Process/ Field Visit	Verify condensate drain piping provided is ASTM B 88, Type M or L, hard drawn copper	A	RA/ QA	—
	Piping	Field Visit	**Flushing -** Confirm/ witness pipe flushing (make sure water is clear prior to putting final chemicals into water system)	V	W	—
		Field Visit	**Strainers -** Confirm start-up strainer has been removed from **all** strainers (hang at location)	A	QA	—
		Field Visit	**Air Vents -** Confirm air vents are at specified locations and are auto type, if req	A	QA	QA
		Submittal Process/ Field Visit	**Pressure Relief Valves -** Confirm pressure relief valves are sized properly and installed where specified	A	RA/ QA	QA
		Field Visit	Confirm make-up water pressure setting is sufficient for facility (adjust if req for pressure req at highest point	A	QA	QA
		Field Visit	**Expansion Tanks -** Where diaphragm expansion tanks are provided, confirm tank pressure is set in accordance with nameplate	A	QA	QA
		Field Visit	Confirm valve arrangements for each unit coil are as specified on the contract documents	A	QA	QA
		Field Visit	Confirm all valve clearance req's, manufacturer, and/or contract have been adhered to	A	QA	QA
		Field Visit	**Layout -** Confirm piping layout conforms to the contract documents (physically walk all pipe runs to make sure there are no cross connections)	A	QA	QA
		Field Visit	Confirm traps have been provided on condensate lines per the contract documents	A	QA	
		Field Visit	Confirm slope of condensate lines meets spec req	A	QA	
		Field Visit	**Supports -** Confirm piping supported properly (ie: hangers, saddles, seismic (if req))	A	QA	QA
		Field Visit	**Insulation -** Confirm pipe insulated with specified insulation and vapor barrier is intact	A	QA	QA
		Submittal Process/ Field Visit	**Fittings -** Confirm dialectric fittings have been provided where piping of dissimilar metals connect	A	RA/ QA	—
		Field Visit	Confirm condensate piping from equip has been run to floor drains, if req	A	QA	QA
		Field Visit	**Identification -** Confirm piping is marked properly with water type and direction of flow	A	QA	QA
		Field Visit	Confirm provisions have been made in the piping arrangement at each coil for isolation of flow and ease of coil removal	A	QA	QA

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MECHANICAL ENGINEERING ROLES and RESPONSIBILITIES

System	Sub-Systems	Phase	Elements	ME QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
Components (continued)		Field Visit	Confirm steam piping relief valve has been piped to the exterior of the building in a safe location to personnel	A	QA	QA
		Field Visit	Confirm hazard warning and/or hot surface signage is in place at steam piping, equip. (This also applies to hot water systems)	A	QA	—
		Field Visit	**Flow Meters -** Confirm location of flow meters meets factory req for straight, unobstructed inlet and outlet piping	A	QA	QA
	Chillers	Field Visit	**Leaving Water Temp -** Confirm the leaving chilled water temp is below temp specified for terminal equip to compensate for pump heat gain (approx 1.8F/1.0C) (chiller leaving should **never** be same as temp req at terminal unit)	A	QA	QA
		Submittal Process/ Field Visit	Confirm piping/valve arrangement matches contract documents and balancing valve and flow monitoring device have been provided in accordance with manufacturers req and/or detail	A	RA/ QA	QA
		Submittal Process/ Field Visit	**Decoupler -** Confirm decoupler leg is tied into chilled return piping before entering chilled water return header (for multiple chillers)	A	RA/ QA	QA
		Field Visit	Confirm piping arrangement has allotment for access to the cooling and condensing bundles	A	QA	QA
		Field Visit	**Flow Switch -** Confirm flow switch has been provided to protect the chiller from low or lack of flow	A	QA	QA
		Submittal Process/ Field Visit	Confirm BACNET compatable (if req in contract docs) and that the connection has been made to the DDC control system	A	RA/ QA	QA
	Chiller Systems - Closed Circuit Coolers	Submittal Process	**Construction and rating** - Confirm provided is factory assembled conforming to NFPA 214	A	RA	—
		Submittal Process	**Fire hazard rating** - Verify fire hazard rating for plastic impregnated materials does not exceed 25	A	RA	—
		Submittal Process	**Certification** - Verify Cooling Technology Institute 201 certification of tower capability and performance is provided	A	RA	—
		Submittal Process	**Cooler performance** - Verify meets or exceeds that listed in ASHRAE 90.1	A	RA	—
		Submittal Process/ Field Visit	**Hardware** - Verify stainless steel hardware provided	A	RA/ QA	—
		Submittal Process	**Vibration cutout switch** - Verify interlocked with fan motor	A	RA	—
		Submittal Process	**Fan motors** - Verify 2-speed or adjustable frequency drive fan motors provided	A	RA	—
		Field Visit	**Safety** - Verify OSHA safety requirements for stairs and handrails are met	A	QA	—

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MECHANICAL ENGINEERING ROLES and RESPONSIBILITIES

System	Sub-Systems	Phase	Elements	ME QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
Equipment &	**Chiller Systems - Water Cooled Chillers**	Submittal Process	**Construction and rating** - Verify self-contained chiller provided meeting requirements of ARI 550/590-98	A	RA	—
		Field Visit	**Control panel** - Verify provided with manufacturer's standard controls and protection circuits	A	QA	—
		Submittal Process/ Field Visit	**DDC system** - If DDC system required in project, verify control interface provided for remote monitoring of chiller's operating parameters, functions, and alarms from DDC control system central workstation	A	RA/ QA	QA
		Submittal Process	**Automatic capacity-reduction system** - Verify provided for stable operation from 100 to 10 percent of full load capacity	A	RA	—
	Chiller Systems - Air Cooled	Submittal Process	**Construction and rating** - Verify provided air-cooled chillers are type indicated in Project Program and meet requirements of ARI 550/590-98	A	RA	—
		Submittal Process	**Control panel** - Verify provided with manufacturer's standard controls and protection circuits	A	RA	—
		Submittal Process/ Field Visit	**DDC System** - If DDC system required in project, verify control interface provided for remote monitoring of chiller's operating parameters, functions, and alarms from DDC control system central workstation	A	RA/ QA	QA
		Submittal Process	**Reciprocating chillers** - Verify minimum of four stages of unloading provided at 25% per stage minimum	A	RA	—
		Submittal Process	**Reciprocating chillers** - Verify provided with hot gas bypass	A	RA	—
		Submittal Process	**Head pressure control** - Verify provided for cold temperature operation	A	RA	—
		Submittal Process/ Field Visit	**Freeze protection** - Verify provided for chiller and piping	A	RA/ QA	QA
		Submittal Process/ Field Visit	**Condenser coils** - Verify provided are copper tube with aluminum fins unless specified otherwise	A	RA/ QA	QA
		Submittal Process/ Field Visit	**Condenser coils** - If condenser coil coatings indicated in ESR Section D30, verify provided with copper tube/ copper fin construction or immersion applied, baked phenolic, or other approved coating. Field applied coatings not acceptable.	A	RA/ QA	QA
		Submittal Process/ Field Visit	**Condenser coils** - Verify condenser coils provided with manufacturer's optional louvered covers or hail guards for protection against vandalism, debris, or hail	A	RA/ QA	—
	Cooling Tower	Field Visit	Confirm tower size HP, voltage per contract docs	A	QA	QA
		Submittal Process/ Field Visit	Confirm tower constructed in accordance with specs (ie: galvanized, stainless steel, fiber-glass)	A	RA/ QA	QA
		Submittal Process/ Field Visit	**Sump -** Confirm height of cooling tower sump is above intake of condenser water pumps (min of 3 to 4 feet)	A	RA/ QA	QA

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MECHANICAL ENGINEERING ROLES and RESPONSIBILITIES

System	Sub-Systems	Phase	Elements	ME QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
Equipment & Components (continued)		Submittal Process/ Field Visit	Confirm return line to tower has trap leg below well unless the by-pass is piped directly to cooling tower well	A	RA/ QA	QA
		Field Visit	**Overflow -** Confirm tower well overflow is low enough to prevent the well from overflowing	A	QA	QA
		Field Visit	**Make-up Float -** Confirm tower well make-up float setting shuts of prior to water level reaching the top of the overflow	A	QA	QA
		Field Visit	**Fan Rotation -** Confirm tower fan rotation is correct	A	QA	QA
		Field Visit	**Well Heater -** Confirm tower well heater is installed, if req	A	QA	QA
		Field Visit	**Shut-off Valve -** Confirm tower shut-off valve has been installed in proper location, if req	A	QA	QA
		Field Visit	**Fan Discharge -** Confirm tower fan discharge is unobstructed from above	A	QA	QA
		Field Visit	**Heat Trace -** Confirm tower piping above grade is heat traced, if req	A	QA	QA
		Submittal Process	**Construction and rating** - Confirm provided is factory assembled conforming to NFPA 214	A	RA	—
		Submittal Process	**Fire hazard rating** - Confirm fire hazard rating for plastic impregnated materials does not exceed 25	A	RA	—
		Submittal Process	**Certification** - Verify Cooling Technology Institute 201 certification of tower capability and performance is provided	A	RA	—
		Submittal Process	**Cooling tower performance** - Verify meets or exceeds that listed in ASHRAE 90.1	A	RA	—
		Submittal Process/ Field Visit	**Construction** - Verify construction is as indicated in ESR Section D30 with fill material of PVC formed sheets	A	RA/ QA	—
		Submittal Process/ Field Visit	**Hardware** - Verify stainless steel hardware provided	A	RA/ QA	—
		Submittal Process	**Vibration cutout switch** - Verify interlocked with fan motor	A	QA	—
		Submittal Process	**Fan motors** - Verify 2-speed or adjustable frequency drive fan motors provided	A	QA	—
		Submittal Process/ Field Visit	**Work platforms** - Verify provided at all locations in tower that require periodic maintenance	A	RA/ QA	
		Submittal Process/ Field Visit	**Isolation valves** - For multi-cell installations, verify isolation valves provided on inlets and outlets of each cell	A	RA/ QA	—
	Fan Coil Units	Field Visit	Confirm size and location in accordance with contract docs	A	QA	QA
		Field Visit	**Filter Access -** Confirm filter accessibility	A	QA	QA
		Field Visit	Confirm vibration isolation provided for on hangers and at ductwork connection	A	QA	QA
		Field Visit	Confirm installation of auxilliary drain pan (if req) along with respective condensate drain piping	A	QA	QA

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System	Sub-Systems	Phase	Elements	ME QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
Equipment & Components (continued)		Field Visit	Confirm valves arranged properly including the straight pipe diameters req before and after the balancing valve	A	QA	QA
		Submittal Process/ Field Visit	**Speed Controller -** Confirm speed controller has been provided, if req in contract docs	A	RA/ QA	QA
		Field Visit	**Fan Access -** Confirm fan access is accessible by maintenance staff	A	QA	QA
		Field Visit	Confirm unit tagging has been provided	A	QA	—
		Field Visit	Confirm operational	A	QA	—
		Submittal Process/ Field Visit	**Sensors -** Confirm leaving air temp sensor has been provided	A	RA/ QA	QA
		Submittal Process	Verify provided are UL-Listed, factory assembled and tested fan coils, ARI 440, and ARI certified	A	QA	—
	Thru Wall Classroom Terminal Units	Field Visit	Confirm size and location in accordance with contract docs	A	QA	QA
		Field Visit	Confirm operational	A	QA	—
		Field Visit	Confirm piping arrangement meets contract docs req's	A	QA	QA
	Packaged Thru Wall Units	Submittal Process	Verify provided is factory assembled air conditioner or heat pump and rated in accordance with ARI 310 or ARI 380 and ARI certified	A	RA	—
		Submittal Process	Verify provided unit includes heat and operates under the standard unit controls (Not sure if worded correctly, D305006 1.4)	A	RA	—
		Submittal Process	**Wall Sleeve -** Verify unit designed to allow ease of maintenance by use of a wall sleeve	A	RA	QA
		Submittal Process/ Field Visit	**Condensate Removal -** Verify provided unit includes internal condensate removal (condensate shall not be externally drained)	A	RA/ QA	QA
	Room Air Conditioners	Submittal Process	Verify provided is factory assembled air conditioner or heat pump and rated in accordance with AHAM RAC-1	A	RA	—
		Submittal Process/ Field Visit	Verify auxiliary electric heat included and operates under the standard unit controls	A	RA/ QA	QA
		Submittal Process	Verify provided unit is AHAM certified or listed in AHAM DCRAC	A	RA	—
	Computer Room Units	Field Visit	Confirm size and location	A	QA	QA
		Field Visit	Confirm all features have been provided	A	QA	QA
		Field Visit	Confirm water connection to humidifier	A	QA	QA
		Field Visit	**Fan Rotation -** Confirm fan rotation	A	QA	QA
		Submittal Process	If computer room unit req'd, verify DOR utilized UFGS Spec section 23 81 23.00 20 (Computer Room Air Conditioning Units) for the project spec and submitted the edited spec section as part of the design submittal for the project	A	RA	—
	Boilers	Field Visit	Confirm size and location	A	QA	—
		Field Visit	**Stack -** Confirm stack material and arrangement meet contract doc req's	A	QA	QA

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System	Sub-Systems	Phase	Elements	ME QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
		Field Visit	**Stack -** Confirm stack above roof does not touch roof curb and guy wires have been provided	A	QA	QA
		Field Visit	**Stack -** Confirm stack type is per contract docs and the height above the parapet and/or building meets code req's	A	QA	QA
		Field Visit	Confirm fuel train meets contract docs and code req's with no leaks	A	QA	QA
		Submittal Process/ Field Visit	**Make-up Air -** Confirm adequate make-up air for the boiler(s) has been provided under positive pressure to the room	A	RA/ QA	QA
		Field Visit	**Relief Valve -** Confirm relief valve setting and operation	A	QA	—
		Field Visit	**DDC -** Confirm boilers have been interfaced with the DDC system	A	QA	QA
		Field Visit	Confirm pump/piping arrangement meets contract docs including circulation pump, if req	A	QA	QA
		Submittal Process/ Field Visit	Confirm boiler sequencing panel has been provided by the boiler manufacturer, if req in the contract docs	A	RA/ QA	QA
	Boilers - Hot Water	Submittal Process	**Load capacity** - Verify boiler type provided meets building load capacity as indicated in ESR Section D30, if required	A	RA	—
		Submittal Process/ Field Visit	**Construction and rating** - Verify boiler designed, tested, and installed per ASME CSD-1 (Controls and Safety Devices) and ASME BPVC (Boiler and Pressure Vessel Code)	A	RA/ QA	—
		Submittal Process/ Field Visit	**Construction** - Verify boiler meets requirements of UL 795, ANSI Z83.3, and ASME CSD	A	RA/ QA	—
		Submittal Process/ Field Visit	**Burners** - Confirm provided are make, model, and type certified and approved by manufacturer of provided boiler	A	RA/ QA	—
		Submittal Process/ Field Visit	Verify burner controls and flame safety equipment conform to either ASME CSD-1 or NFPA 58 as dictated by input	A	RA/ QA	—
		Submittal Process/ Field Visit	**Boiler controls** - Verify are mounted on a single control panel mounted on the burner or separate from the burner (includes operating switches, indicating lights, gages, alarms, motor starters, fuses, and circuit elements of the control system). If separa	A	RA/ QA	—
		Submittal Process/ Field Visit	**Trim** - Verify boiler trim complies with ASME BPVC SEC IV, ASME CSD-1, and additional appurtenances as specified herein	A	RA/ QA	—
		Submittal Process/ Field Visit	**Pressure gages** - Confirm provided have scale equivalent to 1.5 times the outlet water pressure on supply water piping and return water piping	A	RA/ QA	—
		Submittal Process/ Field Visit	**Thermometers - Piping** - Confirm provided have scale equivalent to 1.5 times the outlet water temperature on supply water piping and return water piping	A	RA/ QA	—
		Field Visit	**Drain valve** - Verify provided and piped to floor drain	A	QA	—

MECHANICAL ENGINEERING ROLES and RESPONSIBILITIES

System	Sub-Systems	Phase	Elements	ME QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
Equipment & Components (continued)		Submittal Process/ Field Visit	**Air vent valve** - Verify provided with screwed connection, stainless steel disk, and stainless steel seats to vent entrapped air	A	RA/ QA	—
		Submittal Process	**Boiler stack** - Verify provided boiler stack insulated in accordance with manufacturer's recommendations and conform to NFPA 211, or pre-manufactured multi-wall stacks provided complying with NFPA 54 or NFPA 58 and UL-listed	A	RA	—
		Submittal Process/ Field Visit	**Thermometer - Flue gas** - Verify provided and mounted in flue gas outlet	A	RA/ QA	—
		Field Visit	**Cleaning** - Verify boiler(s) cleaned in accordance with ASME Boiler and Pressure Vessel Code and manufacturer's recommendations prior to startup	A	QA	—
		Field Visit	**Testing** - Verify services are furnished of an engineer or technician approved by the boiler manufacturer for installation, startup, and operational and safety testing	V	W	W
		Field Visit	**Testing** - Verify boiler demonstrates proper operability of combustion control, flame safeguard control, and safety interlocks	V	W	W
	Boilers - Steam		**Confirm meets same requirements specified for hot water boilers except as follows:**			
		Submittal Process/ Field Visit	**Pressure gage** - Confirm provided have scale equivalent to 1.5 times the outlet water pressure on boiler feedwater supply piping and condensate return water piping	A	RA/ QA	—
		Submittal Process/ Field Visit	**Pressure gage** - Confirm provided boiler steam pressure gage has scale equivalent to 1.5 times the boiler rated working pressure	A	RA/ QA	—
		Submittal Process/ Field Visit	**Thermometers - Piping** - Confirm provided have scale equivalent to 1.5 times the outlet water temperature on boiler feedwater piping and return water piping	A	RA/ QA	—
	Insulation - Condensate Drain	Field Visit	**Insulation -** Verify condensate drain piping insulated with flexible cellular insulation	A	QA	—
	Insulation	Field Visit	Verify all ductwork provided with external thermal insulation	A	QA	—

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MECHANICAL ENGINEERING ROLES and RESPONSIBILITIES

System	Sub-Systems	Phase	Elements	ME QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
Equipment & Components (continued)		Field Visit	Verify all ductwork in concelaed spaces insulated with blanket flexible mineral fiber	A	QA	—
		Field Visit	Verify ductwork in mechanical Rooms and exposed locations insulated with rigid mineral fiber insulation	A	QA	—
		Field Visit	Verify insulation provided with factory applied all-purpose jacket with integral vapor retarder	A	QA	—
		Field Visit	In exposed locations, verify jacket provided with white surface suitable for painting	A	QA	—
		Submittal Process/ Field Visit	Verify flame spread/smoke developed rating for all insulation does not exceed 25/ 50	A	RA/ QA	—
		Submittal Process	Verify minimum insulation thickness does not violate minimum required by ASHRAE 90.1	A	RA	—
		Field Visit	Verify the backs of all supply air diffusers insulated with blanket flexible mineral fiber insulation	A	QA	QA
	VFDs	Submittal Process/ Field Visit	Verify are factory-assembled VFD drive control systems for variable speed control	A	RA/ QA	QA
		Submittal Process/ Field Visit	Verify all AHU and pump VFD's are from same manufacturer	A	RA/ QA	QA
		Submittal Process/ Field Visit	Verify each VFD provided includes motor starter, motor disconnects, and controls as required for a complete system	A	RA/ QA	QA
		Submittal Process/ Field Visit	Verify VFD units provided are UL-Listed and comply with the National Electric Code	A	RA/ QA	—
		Submittal Process/ Field Visit	Verify the following accessories were provided: 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	A	RA/ QA	QA
	Air Separators	Submittal Process/ Field Visit	**For hot and chilled water -** Verify provided are ASME rated air separators with tangential inlet and outlet connections and automatic air vent	A	RA/ QA	—
	Solids Separators	Submittal Process/ Field Visit	Verify provided are centrifugal solids separators with automatic drain in open systems.	A	RA/ QA	—
	Expansion Tanks	Submittal Process/ Field Visit	For hot and chilled water - Verify provided are ASME rated expansion tanks with polypropylene or butyl diaphragm or compression tanks as indicated in UFC 3-400-10N.	A	RA/ QA	—
	Make-Up Water Station	Field Visit	Verify station consists of a water pressure-reducing valve, filter, and relief valve in the make-up water line to the chilled and hot water systems to maintain the operating pressure	A	QA	—
		Field Visit	Verify a 20mm (3/4 inch) globe valve by-pass provided around the pressure reducing station	A	QA	—
		Field Visit	Verify a reduced pressure backflow preventer provided upstream of the by-pass	A	QA	—

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System	Sub-Systems	Phase	Elements	ME QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
ent & Components (continued)	**Glycol Make-Up Station**	Submittal Process/ Field Visit	If required, verify a glycol make-up system provided to maintain system proper operating mixture	A	RA/ QA	—
	Chemical Treatment	Submittal Process/ Field Visit	If required, verify chilled and hot water systems provided with automatic chemical treatment system for the control of pH, scale formation, and corrosion inhibition	A	RA/ QA	—
		Field Visit	Verify shot-type feeders provided for manual chemical feed	A	QA	—
		Submittal Process	Verify feeders rated for use with pressures up to 900 kPa (130 PSI) (gage)	A	RA	—
		Submittal Process/ Field Visit	Verify condenser water systems provided with automatic chemical treatment systems that monitor conductivity, pH, etc, and provide for water metering and bleed-off	A	RA/ QA	—
		Submittal Process/ Field Visit	Verify chemicals provided are in accordance with EPA and equipment manufacturer's recommendations	A	RA/ QA	—
	System Flushing	Field Visit	Verify hydronic systems flushed thoroughly prior to system startup	A	QA	—
	Heat Tape	Submittal Process/ Field Visit	Verify heat tape provided is UL-Listed, and self-regulating	A	RA/ QA	—
		Submittal Process/ Field Visit	Verify heat tape provided on piping subject to freezing	A	RA/ QA	QA
	Terminal & package Units	Submittal Process/ Field Visit	Where required in ESR Section D30, verify anti-corrosion coating provided on the casing and both the condenser and evaporater coils to protect against salt air damage	A	RA/ QA	—
		Submittal Process/ Field Visit	Verify anti-corrosion coating is immersion applied, baked phenolic or other approved coating (Field applied coatings are not acceptable)	A	RA/ QA	—
	Seismic Design	Submittal Process	Verify provided inaccordance with UFC 3-400-10N, Mechanical Engineering	A	RA	—
	Energy Recovery Wheel (Enthalpy Wheel)	Field Visit	Verify provided is a total energy (enthalpy) type energy recovery wheel (heat wheel)	A	QA	—
		Submittal Process/ Field Visit	**Media -** Verify media is aluminum or a lightweight polymer coated with a corrosion resistance finish (Etched or oxidized surfaces are not acceptable)	A	RA/ QA	—
		Submittal Process/ Field Visit	Verify heat transfer surfaces are coated with a non-migrating (permanently bonded) absorbent specifically developed for the selective transfer of water vapor	A	RA/ QA	—
		Submittal Process	Verify equal sensible and latent recovery efficiencies are documented through a certification program conducted per ASHRAE 84 and ARI 1060	A	RA	—

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MECHANICAL ENGINEERING ROLES and RESPONSIBILITIES

System	Sub-Systems	Phase	Elements	ME QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
Equipme		Submittal Process/ Field Visit	Verify energy recovery wheel provided with insulating housing of double wall construction, rotor seals specifically designed to limit cross-contamination, and a rotation detector	A	RA/ QA	—
		Field Visit	Verify the rotation detector alarms the HVAC control system if rotation stops	A	QA	—
		Field Visit	**Filter Access -** Verify filter sections are readily accessible for maintenance	A	QA	QA
	Heat Pipes	Submittal Process	Verify provided are factory fabricated, assembled and tested heat pipes with counter-flow arrangement	A	RA	—
		Submittal Process	Verify are provided with hermitically sealed, seamless aluminum tube cores with extended surfaces	A	RA	—
		Submittal Process	Verify heat exchanger frame constructed of not less than 16-gage galvanized steel and fitted with intermediate tube supports and flange connections	A	RA	—
		Submittal Process	Verify tube end covers and a partition of galvanized steel provided to separate exhaust and supply air streams without cross-contamination	A	RA	—
		Submittal Process	**Refrigerant -** Verify refrigerant used as the working fluid (Type I refrigerants are not allowed)	A	RA	—
	Exterior Piping Manholes	Submittal Process/ Field Visit	**Manholes -** Verify system manholes are constructed of reinforced, 206.8 bar (3000 psi) concrete. Verify manhole floor and sides are watertight and were made in one monolithic pour. Verify manhole top extends a minimum of 300 mm (6 inches) above grade. V	A	RA/ QA	—
		Submittal Process	Verify a sump pit and a vertical sump pump designed for an operating temperature design of 93 degrees C (195 degrees F) minimum are provided in each system manhole.	A	RA	—
		Submittal Process	**Sump Pump - Float Control -** Verify a 2-pole float control is provided for each manhole sump pump.	A	RA	—
	Exterior Piping Cathodic Protection	Field Visit	If underground steel piping is installed, verify a cathodic protection system is provided.	A	QA	—
		Submittal Process	If a cathodic protection system is provided, verify the system was designed by a National Association of Corrosion Engineers (NACE) certified Cathodic Protection Engineer and they supervised, inspected and tested the installation and performance of the ca	A	QA	QA
		Field Visit	Verify the test stations were post mounted and placed at the manhole or nearby building and test stations were provided at each end of each cathodically protected section.	A	QA	—
	DDC		Verify one of the following provided as directed in ESR Section D30			
		Submittal Process	A) Verify Direct Digital Controls (DDC) provided to comply with UFGS Section 23 09 54.00 20, Direct Digital Control Systems	A	RA	—

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MECHANICAL ENGINEERING ROLES and RESPONSIBILITIES

System	Sub-Systems	Phase	Elements	ME QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
Equipment & Components (continued)		Submittal Process	A) Verify DOR utilized UFGS Spec Section 23 09 54.00 20, Direct Digital Control Systems, for the project spec, and submitted the edited spec section as part of the design submittal for the project	A	RA	—
		Submittal Process/ Field Visit	B) Verify a partial DDC system provided that communicates with the existing DDC system	A	RA/ QA	—
		Submittal Process	B) Notwithstanding any other provisions of this contract, no other product will be acceptable other than that indicated in ESR Section D30	A	RA	—
		Submittal Process/ Field Visit	B) Verify the system has stand alone digital controllers, a communication network, and a workstation computer with control software (Pneumatic controllers and components are not acceptable)	A	RA/ QA	—
		Submittal Process	B) Verify all 120-volt wiring complies with NFPA 70	A	RA	—
		Submittal Process/ Field Visit	B) Verify all 24-volt wiring complies with the IMC and terminal device manufacturer's recommendations	A	RA/ QA	—
	DDC - Equipment Controllers	Submittal Process/ Field Visit	Verify DDC hardware are UL-916 rated	A	RA/ QA	—
		Submittal Process/ Field Visit	Verify controllers used in a distributed control manner	A	RA/ QA	QA
		Submittal Process/ Field Visit	Verify controllers are stand alone with an internal clock and modem	A	RA/ QA	QA
		Submittal Process	Verify the total number of I/O hardware points do not exceed 48 in any controller	A	RA	QA
		Submittal Process	Verify sufficient memory provided for each controller to support required control, communication, trends, alarms, and messages	A	RA	QA
		Submittal Process/ Field Visit	Verify communications ports provided for controller to controller, on-site interface, remote workstation interface, and telecommunications interface	A	RA/ QA	QA
	DDC - Electronic Controls	Submittal Process/ Field Visit	If required, verify programmable thermostats provided with built in keypads for scheduling of day and night temps with two setback periods per day	A	RA/ QA	QA
		Submittal Process/ Field Visit	Verify independent summer and winter programs provided	A	RA/ QA	QA
		Submittal Process/ Field Visit	Verify thermostats have temporary and manual override of schedule and battery backup	A	RA/ QA	QA
	All Submittals	Submittal Process	All equipment and controls hardware reviewed by A/E	A	RA	RA
	DALTS - Submittals	Submittal Process	TAB contractor qualifications & certification	RA	RA	A
		Submittal Process	DALT test equip with certification	RA	RA	A

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MECHANICAL ENGINEERING ROLES and RESPONSIBILITIES

System	Sub-Systems	Phase	Elements	ME QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
		Submittal Proces	DALT test plan	RA	RA	A
		Submittal Proces	DALT tests report including plan drawing of duct to be tested and square foot calc for each section	RA	RA	A
	DALTS - Testing	Submittal Process	Ductwork to be DALT'd	RA	RA	A
		Field Visit	Testing	V	W	W
		Submittal Proces	Pre-final DALT report	RA	C	A
		Submittal Proces	Certified final DALT report	RA	C	A
	DALTS - Acceptance Testing	Field Visit	Quality assurance - Contracting officer DALT field checks	V	W	W
		Field Visit	Additional field checks	V	W	W
	TABS - Submittals	Submittal Process	TAB contractors qualifications & certification	RA	RA	A
		Submittal Process	Pre-TAB engineering report	RA	RA	A
		Submittal Process	*Discussion on TAB procedure	RA	RA	A
		Submittal Process	*Pre-requisite checklist	RA	RA	A
		Submittal Process	*Design review report	RA	RA	A
		Submittal Process	*Preliminary TAB test report	RA	RA	A
		Submittal Process	Certified TAB test report (Season 1)	RA	RA	A
		Submittal Process	Certified TAB test report (Season 2 (coil data))	RA	RA	A
	TABS - Pre-Test Checklist		**1) Variable Air Volume Series Boxes**			
			a) General			
		Field Visit	Louvers installed	V	W	—
		Field Visit	Manual dampers open and locked	V	W	—
		Field Visit	Automatic dampers set properly	V	W	—
		Field Visit	Housing construction leakage	V	W	—
		Field Visit	Access doors per plans & specs.	V	W	—
		Field Visit	Condensate drain piping & pan	V	W	—
		Field Visit	Free from dirt & debris	V	W	—
		Field Visit	Nameplate data clearly visible	V	W	—
			b) Filters			
		Field Visit	Type / size / number correct	V	W	—
		Field Visit	Clean	V	W	—
		Field Visit	Blank-off plates installed	V	W	—
		Field Visit	Frame leakage at a minimum	V	W	—
			c) Coils (Hydronic – Water / Steam)			
		Field Visit	Size & rows	V	W	—
		Field Visit	Fin spacing & condition	V	W	—
		Field Visit	Obstructions and/or debris	V	W	—
		Field Visit	Correct air flow direction	V	W	—
		Field Visit	Correct piping connections / flow	V	W	—

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System	Sub-Systems	Phase	Elements	ME QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
		Field Visit	Valves open & set	V	W	—
		Field Visit	Vents / traps installed correctly	V	W	—
		Field Visit	Provisions for TAB measurements	V	W	—
			d) Coils (Electric)			
		Field Visit	Size & construction	V	W	—
		Field Visit	Airflow direction	V	W	—
		Field Visit	Duct connections	V	W	—
		Field Visit	Safety switches	V	W	—
		Field Visit	Obstructions	V	W	—
		Field Visit	Free from debris	V	W	—
		Field Visit	Contractors & disconnect switches	V	W	—
		Field Visit	Electrical service & connections	V	W	—
		Field Visit	Nameplate data clearly visible	V	W	—
			e) Fans			
		Field Visit	Rotation	V	W	—
		Field Visit	Wheel clearance & balance	V	W	—
		Field Visit	Bearing & motor lubrication	V	W	—
		Field Visit	Drive alignment	V	W	—
		Field Visit	Belt tension	V	W	—
		Field Visit	Drive set screws tight	V	W	—
		Field Visit	Belt guards in place	V	W	—
		Field Visit	Flex duct connector alignment	V	W	—
		Field Visit	Proper unit / duct alignment	V	W	—
		Field Visit	Starters & disconnect switches	V	W	—
		Field Visit	Electrical service & connections	V	W	—
		Field Visit	Nameplate data clearly visible	V	W	—
			f) Vibration isolation			
		Field Visit	Springs & compression	V	W	—
		Field Visit	Base level & free	V	W	—
			2) DUCT SYSTEMS			
			a) General			
		Field Visit	Manual damper positioned & locked	V	W	—
		Field Visit	Damper adjustments accessible	V	W	—
		Field Visit	Access doors closed & tight	V	W	—
		Field Visit	Fire dampers open & accessible	V	W	—
		Field Visit	Terminal units open & set	V	W	—
		Field Visit	Registers/diffusers wide open & set	V	W	—
		Field Visit	Turning vanes in square elbows	V	W	—
		Field Visit	Provisions made for TAB tests	V	W	—
		Field Visit	System installed per plans & specs.	V	W	—
		Field Visit	All ductwork sealed as required	V	W	—
			b) Architectural			
		Field Visit	Windows installed & closed	V	W	—
		Field Visit	Doors closed as required	V	W	—
		Field Visit	Ceiling plenums installed/sealed	V	W	—
		Field Visit	Access doors closed & tight	V	W	—
		Field Visit	Air shafts/openings as required	V	W	—
			3) PUMPS			
			a) Motors			
		Field Visit	Rotation	V	W	—

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System	Sub-Systems	Phase	Elements	ME QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
System Acceptance (continued)		Field Visit	Lubrication	V	W	—
		Field Visit	Alignment	V	W	—
		Field Visit	Set screws tight	V	W	—
		Field Visit	Guards in place	V	W	—
		Field Visit	Tank level and controls	V	W	—
		Field Visit	Starters & disconnects	V	W	—
		Field Visit	Electrical service & connections	V	W	—
			b) Piping			
		Field Visit	Correct flow	V	W	—
		Field Visit	Correct connections	V	W	—
		Field Visit	Leakage	V	W	—
		Field Visit	Valves positioned & set	V	W	—
		Field Visit	Strainers clean	V	W	—
		Field Visit	Air Vented	V	W	—
		Field Visit	Flexible connectors installed	V	W	—
		Field Visit	Provisions made for TAB tests	V	W	—
		Field Visit	System water clean	V	W	—
			c) Bases			
		Field Visit	Vibration isolation	V	W	—
		Field Visit	Grouting (if required)	V	W	—
		Field Visit	Leveling	V	W	—
			4) HYDRONIC EQUIPMENT			
			a) Boilers			
		Field Visit	Operating controls & devices	V	W	—
		Field Visit	Safety controls & devices	V	W	—
		Field Visit	Lubrication of fans & pumps	V	W	—
		Field Visit	Draft controls & devices	V	W	—
		Field Visit	Piping controls & devices	V	W	—
		Field Visit	Valves set & open	V	W	—
		Field Visit	Water make-up provisions	V	W	—
		Field Visit	Blowdown provisions	V	W	—
		Field Visit	Electrical connections	V	W	—
		Field Visit	Nameplate data clearly visible	V	W	—
			b) Heat Exchangers			
		Field Visit	Correct flow & connections	V	W	—
		Field Visit	Valves open or set	V	W	—
		Field Visit	Air vents or steam traps	V	W	—
		Field Visit	Leakage	V	W	—
		Field Visit	Provisions made for TAB tests	V	W	—
		Field Visit	Nameplate data clearly visible	V	W	—
			c) Cooling Towers/Evaporative Condensers			
		Field Visit	Correct flow & connections	V	W	—
		Field Visit	Valves open or set	V	W	—
		Field Visit	Leakage	V	W	—
		Field Visit	Provisions made for TAB tests	V	W	—
		Field Visit	Sump water level	V	W	—
		Field Visit	Spray nozzles	V	W	—
		Field Visit	Fan/Pump rotation	V	W	—
		Field Visit	Motor/Fan lubrication	V	W	—
		Field Visit	Drives & alignment	V	W	—

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System	Sub-Systems	Phase	Elements	ME QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
System Acceptance (continued)		Field Visit	Guards in place	V	W	—
		Field Visit	Starters & disconnects	V	W	—
		Field Visit	Electrical connections	V	W	—
		Field Visit	Nameplate data clearly visible	V	W	—
			5) REFRIGERANT EQUIPMENT			
		Field Visit	Crankcase heaters energized	V	W	—
		Field Visit	Operating controls & devices	V	W	—
		Field Visit	Safety controls & devices	V	W	—
		Field Visit	Valves open	V	W	—
		Field Visit	Piping connections & flow	V	W	—
		Field Visit	Flexible connectors	V	W	—
		Field Visit	Oil level & lubrication	V	W	—
		Field Visit	Alignment & drives	V	W	—
		Field Visit	Guards in place	V	W	—
		Field Visit	Vibration isolation	V	W	—
		Field Visit	Starters/Contactors/Disconnects	V	W	—
		Field Visit	Electrical connections	V	W	—
		Field Visit	Nameplate data clearly visible	V	W	—
			6) HYDRONIC PIPING SYSTEM			
		Field Visit	Leak tested	V	W	—
		Field Visit	Fluid levels & make-up	V	W	—
		Field Visit	Relief or safety valves	V	W	—
		Field Visit	Expansion tanks & air vents	V	W	—
		Field Visit	Steam traps & connections	V	W	—
		Field Visit	Strainers clean	V	W	—
		Field Visit	Valves open & set	V	W	—
		Field Visit	Provisions made for TAB tests	V	W	—
		Field Visit	Systems installed per plans & specs.	V	W	—
			7) CONTROLS & CONTROL SYSTEMS			
		Field Visit	Data centers	V	W	—
		Field Visit	Outdoor/return Air/reset	V	W	—
		Field Visit	Economizer set & tested	V	W	—
		Field Visit	AHU Static pressure set	V	W	—
		Field Visit	Room controls calibrated	V	W	—
		Field Visit	VAV box regulators set to design	V	W	—
		Field Visit	VAV box P.E. switches set	V	W	—
		Field Visit	Proper end-of-line static pressure	V	W	—
		Field Visit	VAV box reheats tested	V	W	—
			8) OTHER CHECKS			
		Submittal Process	Appropriate contractors notified of TABS	A	RA	S
		Submittal Process	Preliminary data complete	A	RA	S
		Submittal Process	Test report forms prepared	S	RA	A

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System	Sub-Systems	Phase	Elements	ME QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
	TABS - Testing	Field Visit	TAB field work	V	W	
		Submittal Process	Preliminary procedures	RA	C	A
		Field Visit	TAB air distrbution systems	V	W	—
		Field Visit	TAB water distribution systems	V	W	—
		Field Visit	Sound measurement work	V	W	—
		Field Visit	TAB work on performance tests without seasonal limitations	V	W	—
		Field Visit	TAB work on performance tests with seasonal limitations	V	W	—
		Field Visit	Marking settings	V	W	—
		Field Visit	Marking of test ports	V	W	—
	TABS - Acceptance Testing	Field Visit	Quality assurance - Contracting officer TAB field checks	V	W	W
		Field Visit	Additional field checks	V	W	W
	ACATS - Submittals	Submittal Process	Controls contractor qualifications	RA	RA	A
		Submittal Process	Manufacturers field report	RA	RA	A
		Submittal Process	Performance verification test plan (PVT)	RA	RA	A
		Submittal Process	Pre-PVT checklist	RA	RA	A
		Submittal Process	Final certified PVT report (with all mods incorporated in as-builts)	RA	RA	A
	ACATS - Pre-PVT Checklist	Field Visit	Prior to conducting the PVT, thoroughly inspect the installed work with the Contractor's QC representative and the mechanical contractor using the following checklist. Submit the checklist with items checked off once verified. Provide a detailed explana	V	W	—
		Field Visit	a. Verify all required mechanical installation work is successfully completed, and all HVAC equipment is working correctly (or will be by the time the PVT is conducted).	V	W	—
		Field Visit	b. Verify HVAC motors operate below full-load amperage ratings.	V	W	—
		Field Visit	c. Verify all required control system components, wiring, and accessories are installed.	V	W	—
		Field Visit	d. Verify the installed control system architecture matches approved drawings.	V	W	—
		Field Visit	e. Verify all control circuits operate at the proper voltage and are free from grounds or faults.	V	W	—
		Field Visit	f. Verify all required surge protection is installed and functions correctly.	V	W	—
		Field Visit	g. Verify the A/C Power Table specified in "CONTROLS SYSTEM OPERATORS MANUALS" is accurate.	V	W	—

KEY = A - Approve, R - Review, W - Witness, RA - Receipt Acknowledge, S - Surveilance Review, V- Verification and Testing, C - Copy, QA - Quality Assurance

MECHANICAL ENGINEERING ROLES and RESPONSIBILITIES

System	Sub-Systems	Phase	Elements	ME QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
System Acceptance (continued)		Field Visit	h. Verify all DDC network communications function properly, including uploading and downloading programming changes.	V	W	—
		Field Visit	i. Using the BACnet protocol analyzer (if provided or required in this specification), verify communications are error free.	V	W	—
		Field Visit	j. Verify each digital controller's programming is backed up.	V	W	—
		Field Visit	k. Verify all wiring, components, and panels are properly labeled.	V	W	—
		Field Visit	l. Verify all required points are programmed into devices.	V	W	—
		Field Visit	m. Verify all TAB work affecting controls is complete.	V	W	—
		Field Visit	n. Verify all valve and actuator zero and span adjustments are set properly.	V	W	—
		Field Visit	o. Verify all sensor readings are accurate and calibrated.	V	W	—
		Field Visit	p. Verify each control valve and actuator goes to normal position upon loss of power.	V	W	—
		Field Visit	q. Verify all control loops are tuned for smooth and stable operation. View trend data where applicable.	V	W	—
		Field Visit	r. Verify each controller works properly in stand-alone mode.	V	W	—
		Field Visit	s. Verify all safety controls and devices function properly, including interfaces with building fire alarm systems.	V	W	—
		Field Visit	t. Verify all electrical interlocks work properly.	V	W	—
		Field Visit	u. Verify all workstations, notebooks and maintenance personnel interface tools are delivered, all system and database software is installed, and graphic pages are created for each workstation and notebook. Notify the Government when phone lines or netw	V	W	—
		Field Visit	v. Verify the as-built (shop) control drawings are completed.	V	W	—
	ACATS - Testing	Field Visit	Field testing of components	V	W	—
		Field Visit	Field testing of programming	V	W	—
		Field Visit	Pre-performance verification testing	V	W	—
	ACATS - Acceptance Testing	Field Visit	Performance verification testing	V	W	W
		Field Visit	Performance verification re-resting	V	W	W

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ROOFING ROLES and RESPONSIBILITIES

System	Sub-Systems	Phase	Elements	Roof QC / DOR (Ktr)	FEAD (SIOH)	FEC (PCAS)
Roofing	**Low Sloped Roofs**	Design Guidance	Post Award Kick Off Meeting		S	A
		Design Guidance	Verify Roof Design Assurance	A	R	S
		Submittal Process	Review Shop Drawings	A	S	S
		Submittal Process	Review Manufacturer's Product Data Sheets	A	S	S
		Submittal Process	Review Design Data (to include wind and fire resistance)	A	S	S
		Submittal Process	Review Test Reports	A	S	S
		Submittal Process	Review Certificates	A	S	S
		Submittal Process	Review Sample Roof Warranty	A	S	C
		Field Visit	Conduct Pre Roofing Conference	V	S	S
		Field Visit	Review Delivery, Storage, and Handling	A	S	S
		Field Visit	Verify Conditions for roof application	A	S	S
		Field Visit	Verify Preparation	A	S	S
		Field Visit	Verify Application	A	S	S
		Field Visit	Verify Protection of Applied Roofing	A	S	S
		Field Visit	Verify Field Quality Control	A	S	S
		Field Visit	Verify Operation Maintenance and Support Information (Roof Warranty and Information Card)	A	S	S
	Steep Sloped Roofs	Design Guidance	Post Award Kick Off Meeting		S	A
		Design Guidance	Verify Roof Design Assurance	A	R	S
		Submittal Process	Review Shop Drawings	A	S	S
		Submittal Process	Review Manufacturer's Product Data Sheets	A	S	S
		Submittal Process	Review Design Data (to include wind and fire resistance)	A	S	S
		Submittal Process	Review Test Reports	A	S	S
		Submittal Process	Review Certificates	A	S	S
		Submittal Process	Review Sample Roof Warranty	A	S	C
		Field Visit	Conduct Pre Roofing Conference	V	S	S
		Field Visit	Review Delivery, Storage, and Handling	A	S	S
		Field Visit	Verify Conditions for roof application	A	S	S
		Field Visit	Verify Preparation	A	S	S
		Field Visit	Verify Application	A	S	S
		Field Visit	Verify Protection of Applied Roofing	A	S	S
		Field Visit	Verify Field Quality Control	A	S	S
		Field Visit	Verify Operation Maintenance and Support Information (Roof Warranty and Information Card)	A	S	S

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UNDERWATER STRUCTURES ROLES and RESPONSIBILITIES

System	Sub-Systems	Phase	Elements	UW QC / DOR (Ktr)	FEAD (SIOH)	FEC/NF ESC (PCAS)
Waterfront Structure H10 (Uniformat II) - Substructure H1010	**Pile Foundations (H101001) Sheet Piles (H101001) Caissons (H101001) Cofferdams (H101001) Wraps and Encasements (H101001) Sheet Pile Bulheads (H101003) Gravity Walls (H101003) Block Walls (H101003) Seawalls (H101006) Boat Ramps (H101007) Cut-Off Walls (H101008) Wave Attenuation Walls (H101009) Fender Piles (H104001) Dolphins (H104004)**	Submittal Process	Shop Drawings	A	C	S
		Submittal Process	Manufacturer's Data Sheets	A	C	S
		Submittal Process	Pile driving records	A	C	S
		Submittal Process	Concrete testing: petrographic, chemical, service-life modeling	A	C	S
		Submittal Process	As-built drawings, 3D AUTOCAD format	A	C	S
		Field Visit	Validate in-water/underwater structure complies with RFP requirements, e.g., number, location, size, etc.	A	—	W
		Field Visit	Inspect in-water prestressed/precast concrete piles or sheetpiles for alignment, spalls, cracks, damages, defects, lifting hoops cut/area patched, exposed steel ties, penetrations, etc.	A	—	W
		Field Visit	Inspect in-water cast-in-place concrete drilled caissons for alignment, spalls, cracks, damages, defects, concrete quality (hardness), honeycombing, etc.	A	—	W
		Field Visit	Inspect in-water steel piles and/or p/c p/s concrete sheetpiles for alignment, damage/buckling, coating damage, penetrations, gaps, etc.	A	—	W
		Field Visit	Inspect underwater concrete placement for defects such as honeycombing, concrete quality (hardness)	A	—	W
		Field Visit	Inspect underwater slope protection for conformance with RFP requirements such as rock/boulder size, placement gap limits, angle, location (e.g., toe of slope protection), consistency, etc.	A	—	W
		Field Visit	Inspect underwater Cathodic Protection anodes and connections	A	—	W
		Field Visit	Inspect for underwater debris, existing or by construction.	A	—	W
		Field Visit	Validate in-water/underwater structure complies with RFP requirements, e.g., number, location, size, etc.	A	—	W
		Field Visit	Validate in-water/underwater structure complies with RFP requirements, e.g., number, location, size, etc.	A	—	W
		Field Visit	Validate in-water/underwater structure complies with RFP requirements, e.g., number, location, size, etc.	A	—	W

KEY = A - Approve, R - Review, W - Witness, RA - Receipt Acknowledge, S - Surveilance Review, V- Verification and Testing, C - Copy, QA - Quality Assurance

UNDERWATER STRUCTURES ROLES and RESPONSIBILITIES

System	Sub-Systems	Phase	Elements	UW QC / DOR (Ktr)	FEAD (SIOH)	FEC/NFESC (PCAS)
Underwater Cables	All	Submittal Process	Shop Drawings	A	C	S
		Submittal Process	Manufacturer's Data Sheets	A	C	S
		Field Visit	Validate in-water/underwater cable complies with RFP requirements, e.g., number, location, size, etc.	A	—	W
		Field Visit	Inspect underwater cable for defects/damages, kinks, missing anchors, coating damage, etc.	A	—	W
		Field Visit	Inspect for underwater debris, existing or by construction.	A	—	W
Underwater Utility Pipes and Conduits	All	Submittal Process	Shop Drawings	A	C	S
		Submittal Process	Manufacturer's Data Sheets	A	C	S
		Field Visit	Validate in-water/underwater component complies with RFP requirements, e.g., number, location, size, etc.	A	—	W
		Field Visit	Inspect underwater component for defects/damages, cracks, missing anchors, coating damage, etc.	A	—	W
		Field Visit	Inspect for underwater debris, existing or by construction.	A	—	W

KEY = A - Approve, R - Review, W - Witness, RA - Receipt Acknowledge, S - Surveilance Review, V- Verification and Testing, C - Copy, QA - Quality Assurance

DEFINITIONS

Approve	(A)	Professional or quality control endorsement of the submittal or installed system meets the contract requirements
Review	(R)	To confirm accuracy of the submittal and that it meets contract requirements
Witness	(W)	Observe demonstration of system performance for acceptance
Receipt **A**cknowledge	(RA)	Confirm receipt of submittal with no review necessary
Surveillance Review	(S)	A quality assurance review based on risk, complexity, and workload
Performance **V**erification and Acceptance Testing	(V)	A demonstration of satisfactory construction and system performance
Receive **C**opy of Correspondence	(C)	Receive a copy of the transmittal sheet and/or correspondence letter
Quality **A**ssurance Inspection	(QA)	Witnessing satisfactory performance without testing all devices or visual inspection of various parts of the system

SECTION 01 50 00.05 20

TEMPORARY FACILITIES AND CONTROLS FOR DESIGN-BUILD
06/10

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C511	(2007) Standard for Reduced-Pressure Principle Backflow Prevention Assembly

FOUNDATION FOR CROSS-CONNECTION CONTROL AND HYDRAULIC RESEARCH (FCCCHR)

FCCCHR List	(continuously updated) List of Approved Backflow Prevention Assemblies
FCCCHR Manual	(1988e9) Manual of Cross-Connection Control

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 241	(2009) Standard for Safeguarding Construction,Alteration, and Demolition Operations
NFPA 70	(2008; AMD 1 2008) National Electrical Code - 2008 Edition

U.S. FEDERAL HIGHWAY ADMINISTRATION (FHWA)

FHWA SA-89-006	(1988) Manual on Uniform Traffic Control Devices for Streets and Highways

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

40 CFR 247	Comprehensive Procurement Guideline for Products Containing Recovered Materials

1.2 SUBMITTALS

The use of a "G" following a submittal indicates that a Government approval action is required. Submit the following in accordance with Section 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES and Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES.

SD-01 Preconstruction Submittals

Traffic control plan; G

SD-06 Test Reports

Backflow Preventer Tests; G

SD-07 Certificates

Backflow Tester Certification; G

Backflow Preventers Certificate of Full Approval

1.3 EPA LISTED ITEMS USED IN CONDUCT OF THE WORK BUT NOT INCORPORATED IN THE WORK

There are many products listed in 40 CFR 247 which have been designated or proposed by EPA to include recycled or recovered materials that may be used by the Contractor in performing the work but will not be incorporated into the work. These products include office products, temporary traffic control products, and pallets. These non-construction products contain the highest practicable percentage of recycled or recovered materials and can be recycled when no longer needed.

1.4 BACKFLOW PREVENTERS CERTIFICATE

Certificate of Full Approval from FCCCHR List, University of Southern California, attesting that the design, size and make of each backflow preventer has satisfactorily passed the complete sequence of performance testing and evaluation for the respective level of approval. Certificate of Provisional Approval will not be acceptable.

1.4.1 Backflow Prevention Training Certificate

The Contractor shall submit a certificate recognized by the State or local authority that states the Contractor has completed at least 10 hours of training in backflow preventer installations. The certificate must be current.

1.5 TEMPORARY UTILITIES

1.5.1 Contractor Utilities

1.5.2 Utilities at Special Locations

Reasonable amounts of utilities will be made available to the Contractor at the prevailing Government rates and may be obtained upon application to the Base Maintenance Officer, Bldg. 1202, Marine Corps Base, Camp Lejeune. A refundable security deposit to the Resident Officer in Charge of Construction shall be made prior to application for services. The Contractor shall be responsible for providing transformers, meter bases, electrical service poles and drops for electrical services, and backflow preventer devices on connections to domestic water lines. Final taps and tie-ins to the Government utility grid will be made by Base Maintenance who will also provide and seal a 120 or 208 volt, three-wire kWh meter. Tap-in cost, if any, shall be the responsibility of the Contractor. Tampering or movement of a sealed meter without notification to base maintenance is grounds for discontinuance of electrical service. The Contractor shall be responsible for providing larger meters required if not available from the Government. The Contractor shall be responsible for the cost of utility services required until the date of Government acceptance. Under no

circumstances will taps to base fire hydrants be allowed for obtaining domestic water.

1.6 BACKFLOW TESTER CERTIFICATION

Prior to testing, submit to the Contracting Officer certification issued by the State or local regulatory agency attesting that the backflow tester has successfully completed a certification course sponsored by the regulatory agency. Tester shall not be affiliated with any company participating in any other phase of this Contract.

]1.7 WEATHER PROTECTION

Take necessary precautions to ensure that roof openings and other critical openings in the building are monitored carefully. Take immediate actions required to seal off such openings when rain or other detrimental weather is imminent, and at the end of each workday.

1.7.1 Building and Site Storm Protection

When a warning of gale force winds is issued, take precautions to minimize danger to persons, and protect the work and nearby Government property. Precautions shall include, but are not limited to, closing openings; removing loose materials, tools and equipment from exposed locations; and removing or securing scaffolding and other temporary work. Close openings in the work when storms of lesser intensity pose a threat to the work or any nearby Government property.

1.7.1.1 Hurricane Condition of Readiness

Unless directed otherwise, comply with:

a. Condition FOUR (Sustained winds of 58 mph or greater expected within 72 hours): Normal daily jobsite cleanup and good housekeeping practices. Collect and store in piles or containers all scrap lumber, waste material, and rubbish for removal and disposal at the close of each work day. Maintain the construction site including storage areas, free of accumulation of debris. Stack form lumber in neat piles less than 4 feet high. Remove all debris, trash, or objects that could become missile hazards. Review requirements pertaining to "Condition THREE" and continue action as necessary to attain "Condition FOUR" readiness. Contact Contracting Officer for Condition of Readiness (COR) updates and completion of required actions.

b. Condition THREE (Sustained winds of 58 mph or greater expected within 48 hours): Maintain "Condition FOUR" requirements and commence securing operations necessary for "Condition TWO" readiness. Cease all routine activities which might interfere with securing operations. Commence securing and stow all gear and portable equipment. Make preparations for securing buildings. Reinforce or remove formwork and scaffolding. Secure machinery, tools, equipment, materials, or remove from the jobsite. Expend every effort to clear all missile hazards and loose equipment from general base areas. Contact Contracting Officer for weather and COR updates and completion of required actions.

c. Condition TWO (Sustained winds of 58 mph or greater expected within 24 hours): Secure the jobsite, and leave Government

premises.

d. Condition ONE (Sustained winds of 58 mph or greater expected within 12 hours): Contractor access to the jobsite and Government premises is prohibited.

1.8 STATION OPERATION AFFECT ON CONTRACTOR OPERATIONS

1.8.1 Interruption of Vehicular Traffic

If during the performance of work, it becomes necessary to modify vehicular traffic patterns at any locations, notify the Contracting Officer at least 15 calendar days prior to the proposed modification date, and provide a Traffic Control Plan detailing the proposed controls to traffic movement for approval. The plan shall be in accordance with State and local regulations and the FHWA SA-89-006, Part VI. Provide cones, signs, barricades, lights, or other traffic control devices and personnel required to control traffic. Do not use foil-backed material for temporary pavement marking because of its potential to conduct electricity during accidents involving downed power lines.

1.9 STORAGE AREAS

The Contract Clause entitled "FAR 52.236-10, Operations and Storage Areas" and the following apply:

1.9.1 Storage in Existing Buildings

The Contractor shall be working around existing buildings; the storage of material will not be allowed in the buildings.

1.10 TEMPORARY SANITARY FACILITIES

Provide adequate sanitary conveniences of a type approved for the use of persons employed on the work, properly secluded from public observation, and maintained in such a manner as required and approved by the Contracting Officer. Maintain these conveniences at all times without nuisance. Upon completion of the work, remove the conveniences from the premises, leaving the premises clean and free from nuisance. Dispose of sewage through connection to a municipal, district, or station sanitary sewage system. Where such systems are not available, use chemical toilets or comparably effective units, and periodically empty wastes into a municipal, district, or station sanitary sewage system, or remove waste to a commercial facility. Include provisions for pest control and elimination of odors.

1.11 TEMPORARY BUILDINGS

Temporary facilities (including trailers) shall be in like new condition and shall be maintained throughout the project. Locate these facilities where directed and within the indicated operations area. Failure to maintain storage trailers or buildings to these standards shall result in the removal of non-complying units at the Contractor's expense. A sign not smaller than 24 by 24 inches shall be conspicuously placed on the trailer depicting the company name, business phone number, and emergency phone number. Trailers shall be anchored to resist high winds and must meet applicable state of local standards for anchoring mobile trailers.

1.11.1 Quality Control Manager Records and Field Office

Provide on the jobsite an office with approximately 100 square feet of useful floor area for the exclusive use of the QC Manager. Provide a weathertight structure with adequate heating and cooling, toilet facilities, lighting, ventilation, a 4 by 8 foot plan table, a standard size office desk and chair, computer station, and working communications facilities. Provide either a 1,500 watt radiant heater and a window-mounted air conditioner rated at 9,000 Btus minimum or a window-mounted heat pump of the same minimum heating and cooling ratings. Provide a door with a cylinder lock and windows with locking hardware. Make utility connections. Locate as directed. File quality control records in the office and make available at all times to the Government. After completion of the work, remove the entire structure from the site.

PART 2 PRODUCTS

2.1 BACKFLOW PREVENTERS

Reduced pressure principle type conforming to the applicable requirements AWWA C511. Provide backflow preventers complete with bronze gate valve and strainer. The particular make, model/design, and size of backflow preventers to be installed shall be included in the latest edition of the List of Approved Backflow Prevention Assemblies issued by the FCCCHR List and shall be accompanied by a Certificate of Full Approval from FCCCHR List.

2.2 PROJECT SIGN

Prior to initiating any work on site, provide one project identification sign at the location coordinated with the Contracting Officer. Construct the sign in accordance with project sign detail attached at the end of this section. Maintain sign throughout the life of the project. Upon completion of the project, remove the sign from the site. Provide color rendering of the project. Reproduce the rendering on the signboard or enclose a copy of the rendering under a water-proof, transparent cover, and caulk for weather protection. Provide rendering in accordance with Section 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES.]

2.2.1 Project Identification Signboard (Navy)

A project identification signboard shall be provided in accordance with attached Plates. The signboard shall be provided at a conspicuous location on the job site where directed by the Contracting Officer.

a. The field of the sign shall consist of a minimum of 4 by 8 foot sheet of exterior plywood.

b. The entire signboard and supports shall be painted. The lettering and sign work shall be performed by a skilled sign painter using paint known in the trade as bulletin colors. The colors, lettering sizes, and lettering styles shall be as indicated.

c. NAVFAC logo shall be a sticker/decal with either transparent or white background or paint the logo by stencil onto the sign. The weather resistant sticker/decal film shall be rated for a minimum of 2-year exterior vertical exposure. NAVFAC Logo is available at: https://portal.navfac.navy.mil/portal/page?_pageid=181,3465071&_dad=portal&_schema=PORTAL

d. Sign paint colors

(1) Blue = To match dark blue color in the NAVFAC logo.

(2) White = To match Brilliant White color in the NAVFAC logo.

e. Final signboard artwork (rendering) may be either mounted under plexiglas as indicated in attached Plates, or at the Contractor's option may be electrostatically printed on self-adhering, weather resistant, glossy vinyl film and mounted to signboard. Provide film that is capable of full color reproduction of the building rendering and is rated for a minimum of 2 years exterior vertical exposure.

PART 3 EXECUTION

3.1 TEMPORARY PHYSICAL CONTROLS

3.1.1 Access Controls

3.1.1.1 Temporary Barricades

Contractor shall provide for barricading around all work areas to prevent public access.

3.1.1.2 Fencing

a. Provide fencing along the construction site at all open excavations and tunnels to control access by unauthorized people. Fencing must be installed to be able to restrain a force of at least 250 pounds against it.

b. In addition, prior to the start of work, enclose the construction site with a temporary safety fence. The safety fence shall be bright orange, shall be made of high density polyethylene grid or approved equal or plastic fence from recovered materials containing 60-100 percent recovered content level plastic, a minimum of 42 inches high, supported and tightly secured to steel posts located on minimum 10 foot centers. Remove the fence from the work site upon completion of the contract.

3.1.1.3 Signs

Place warning signs at the construction area perimeter designating the presence of construction hazards requiring unauthorized persons to keep out. Signs must be placed on all sides of the project, with at least one sign every 300 feet. All points of entry shall have signs designating the construction site as a hard hat area.

3.1.1.4 Traffic Work

All work around/involving roadways, to include roadway excavations and utility crossings, will be conducted in accordance with FHWA Manual on Uniform Traffic Control Devices for Streets and Highways. Contractors shall provide and ensure appropriate road closure and detour signs are established as necessary for motor traffic management. All road closures shall be coordinated with the Contracting Officer in advance. Self-illuminated (lighted) barricades shall be provided during hours of

darkness. Brightly-colored (orange) vests are required for all personnel working in roadways. Road closures shall require a road closure plan showing the location of signage.

3.2 TEMPORARY WIRING

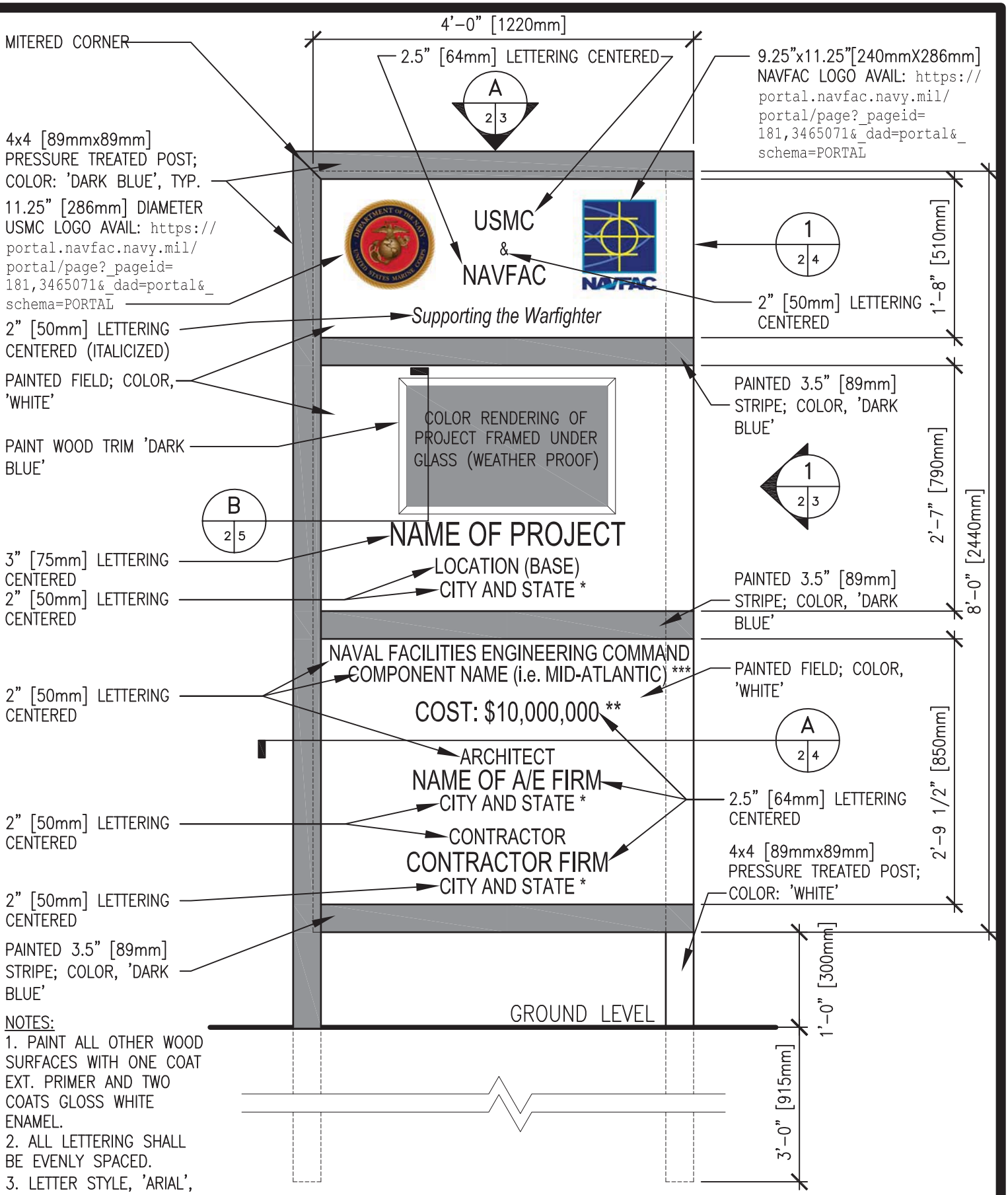
Provide temporary wiring in accordance with NFPA 241 and NFPA 70, Assured Equipment Grounding Conductor Program. Program shall include frequent inspection of all equipment and apparatus.

3.3 REDUCED PRESSURE BACKFLOW PREVENTERS

Provide an approved reduced pressure backflow prevention assembly at each location where the Contractor taps into the Government potable water supply.

A certified tester(s) shall perform testing of backflow preventer(s) for proper installation and operation and provide subsequent tagging. Backflow preventer tests shall be performed using test equipment, procedures, and certification forms conforming to those outlined in the latest edition of the Manual of Cross-Connection Control published by the FCCCHR Manual. Test and tag each reduced pressure backflow preventer upon initial installation (prior to continued water use) and quarterly thereafter. Tag shall contain the following information: make, model, serial number, dates of tests, results, maintenance performed, and signature of tester. Record test results on certification forms conforming to requirements cited earlier in this paragraph.

-- End of Section --



NOTES:

1. PAINT ALL OTHER WOOD SURFACES WITH ONE COAT EXT. PRIMER AND TWO COATS GLOSS WHITE ENAMEL.
2. ALL LETTERING SHALL BE EVENLY SPACED.
3. LETTER STYLE, 'ARIAL', COLOR 'DARK BLUE'. TYPICAL FOR ALL LETTERING.

*–ABBREVIATE STATE
**–CONFIRM USE WITH CONTRACTING OFFICER
***–VERIFY NAME WITH CONTRACTING OFFICER

PROJECT IDENTIFICATION SIGNBOARD FOR MARINE CORPS PROJECTS

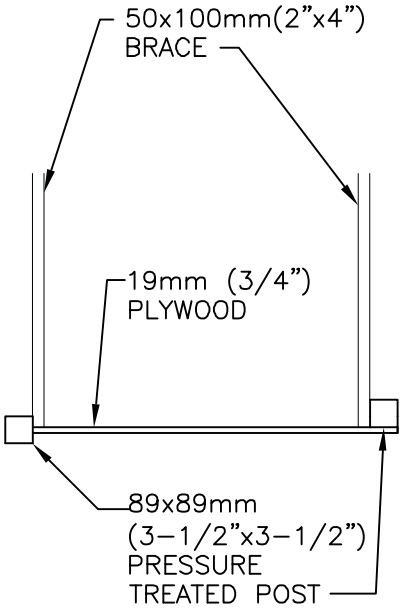
SCALE: 3/4" = 1'-0"

PLATE 2MC

REV DATE: 2008 03 18 rem

NOTE: POSTS AND BRACES SHALL BE PRESSURE TREATED. ALL FASTENINGS SHALL BE ZINC COATED.

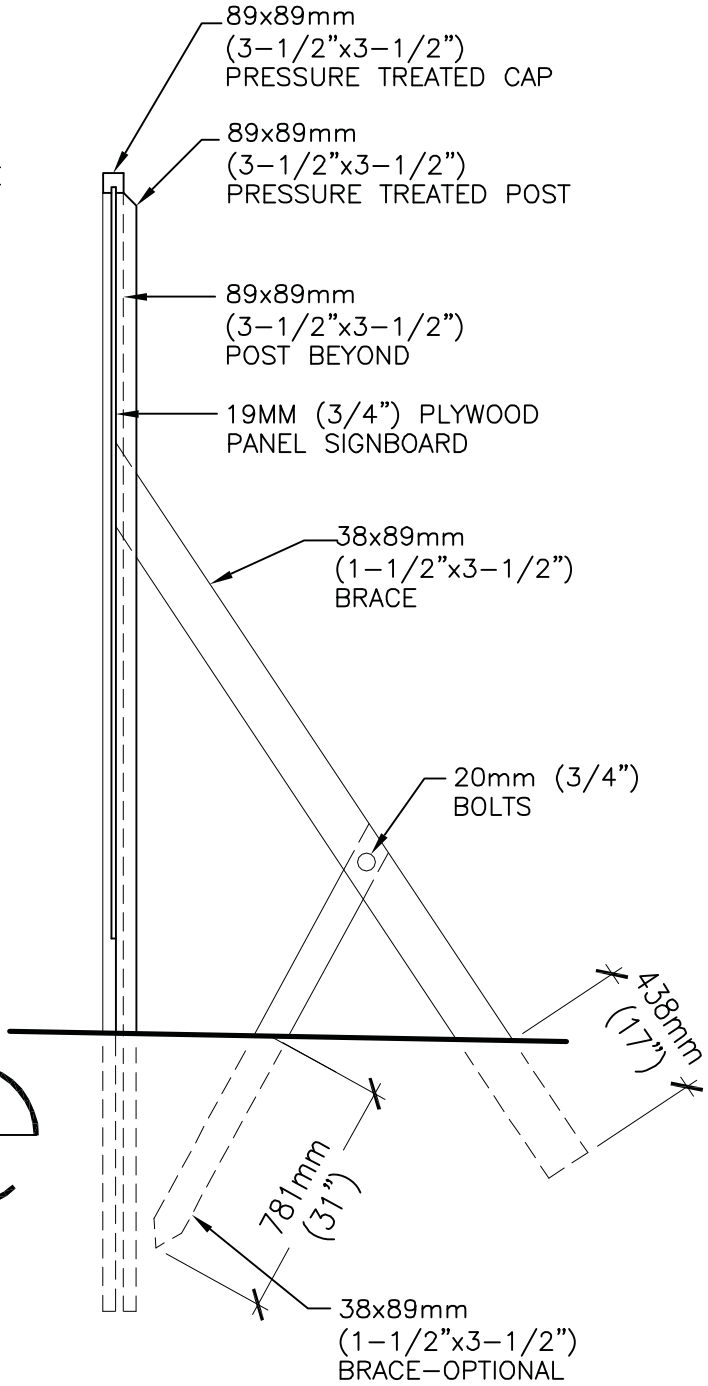
INCLUDE OPTIONAL BRACING IN UNSTABLE SOIL OR HIGH WIND ENVIRONMENTS.



TOP VIEW

SCALE: 3"=1'-0"

A
1, 2 | 3

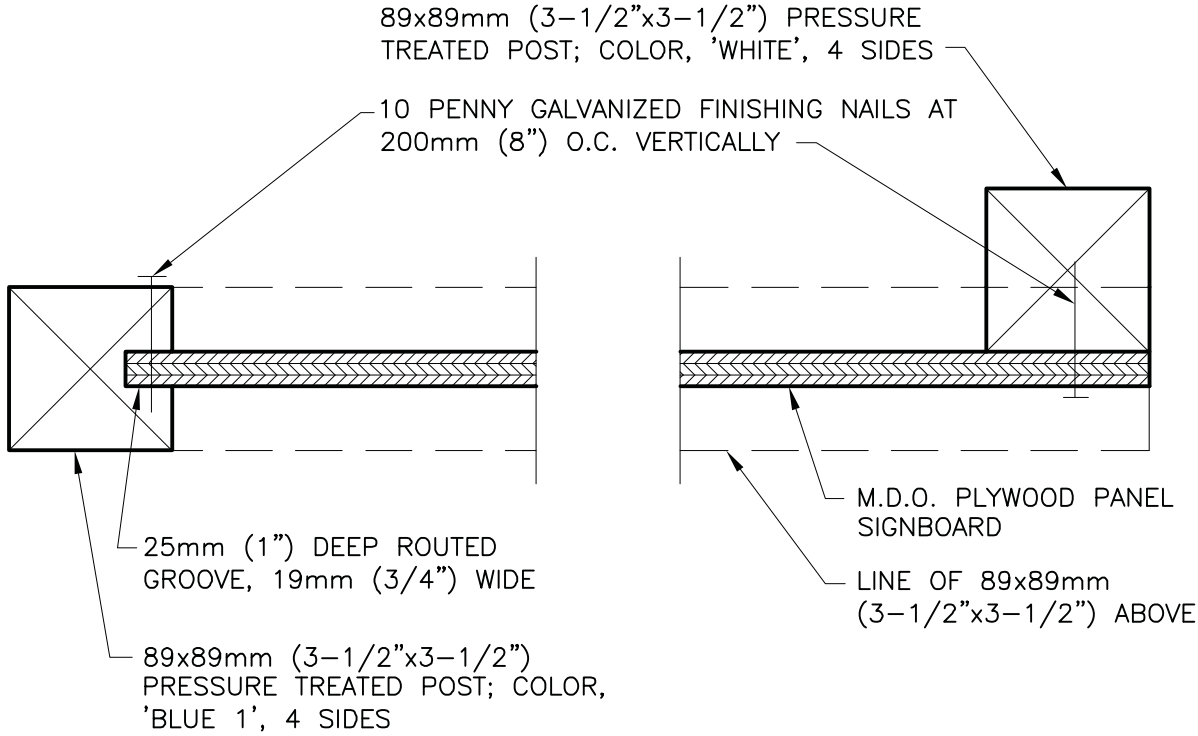


SIDE VIEW

1
1, 2 | 3

PROJECT IDENTIFICATION SIGNBOARD SUPPORT DETAILS

SCALE: NONE



PLAN SECTION

SCALE: NONE

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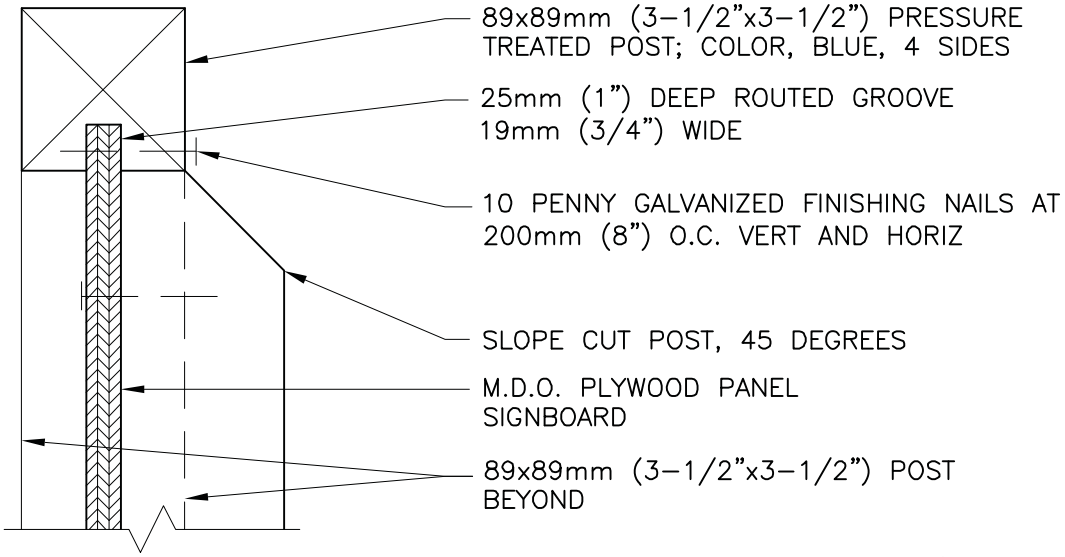
1, 2 | 4



DETAIL @ END

SCALE: NONE

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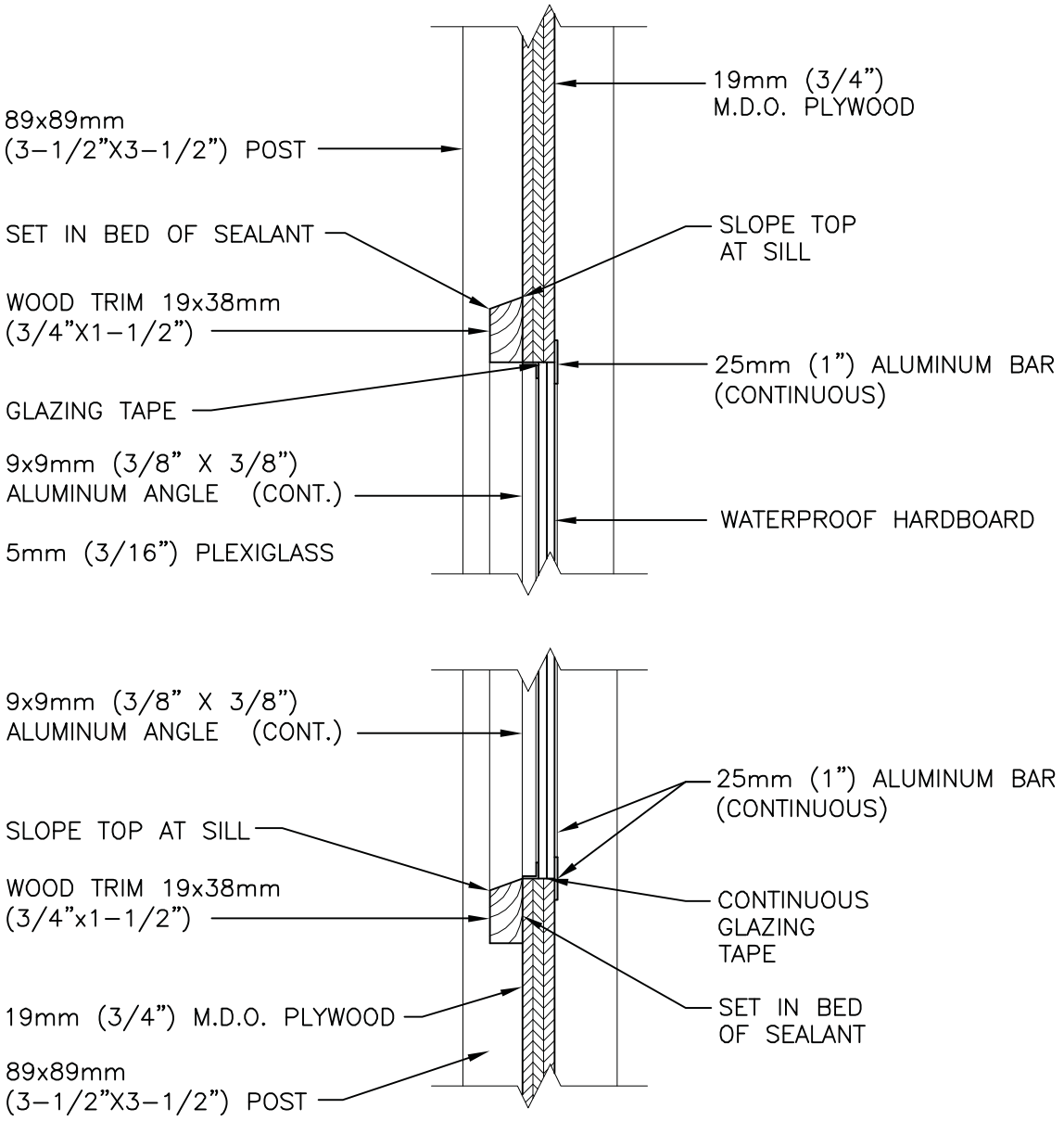
1, 2 | 4

PROJECT IDENTIFICATION SIGNBOARD SECTIONS



SECTION

SCALE: NONE

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2 | 5

PROJECT IDENTIFICATION SIGNBOARD
RENDERING DETAIL

SECTION 01 57 19.00 20

TEMPORARY ENVIRONMENTAL CONTROLS
06/10

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 530/F-93/004	(1993; Rev O; Updates I, II, IIA, IIB, and III) Test Methods for Evaluating Solid Waste (Vol IA, IB, IC, and II) (SW-846)
EPA 833-R-060-04	(2000) Developing Your Storm Water Pollution Prevention Plan, a Guide for Construction Sites

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910.120	Hazardous Waste Operations and Emergency Response
40 CFR 112	Oil Pollution Prevention
40 CFR 241	Guidelines for Disposal of Solid Waste
40 CFR 243	Guidelines for the Storage and Collection of Residential, Commercial, and Institutional Solid Waste
40 CFR 258	Subtitle D Landfill Requirements
40 CFR 260	Hazardous Waste Management System: General
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Standards Applicable to Generators of Hazardous Waste
40 CFR 263	Standards Applicable to Transporters of Hazardous Waste
40 CFR 264	Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 265	Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 266	Standards for the Management of Specific

	Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities
40 CFR 268	Land Disposal Restrictions
40 CFR 270	EPA Administered Permit Programs: The Hazardous Waste Permit Program
40 CFR 271	Requirements for Authorization of State Hazardous Waste Programs
40 CFR 272	Approved State Hazardous Waste Management Programs
40 CFR 273	Standards For Universal Waste Management
40 CFR 279	Standards for the Management of Used Oil
40 CFR 280	Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks (UST)
40 CFR 300	National Oil and Hazardous Substances Pollution Contingency Plan
40 CFR 355	Emergency Planning and Notification
40 CFR 372-SUBPART D	Specific Toxic Chemical Listings
40 CFR 51	Requirements For Preparation, Adoption, And Submittal Of Implementation Plans
40 CFR 52	Approval And Promulgation Of Implementation Plans
40 CFR 60	Standards of Performance for New Stationary Sources
40 CFR 61	National Emission Standards for Hazardous Air Pollutants
40 CFR 63	National Emission Standards For Hazardous Air Pollutants For Source Categories
40 CFR 761	Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions
40 CFR 82	Protection of Stratospheric Ozone
49 CFR 171	General Information, Regulations, and Definitions
49 CFR 172	Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements
49 CFR 173	Shippers - General Requirements for

Shipments and Packagings

49 CFR 178 Specifications for Packagings

1.2 DEFINITIONS

1.2.1 Sediment

Soil and other debris that have eroded and have been transported by runoff water or wind.

1.2.2 Solid Waste

Garbage, refuse, debris, sludge, or other discharged material, including solid, liquid, semisolid, or contained gaseous materials resulting from domestic, industrial, commercial, mining, or agricultural operations. Types of solid waste typically generated at construction sites may include:

a. Green waste: The vegetative matter from landscaping, land clearing and grubbing, including, but not limited to, grass, bushes, scrubs, small trees and saplings, tree stumps and plant roots. Marketable trees, grasses and plants that are indicated to remain, be re-located, or be re-used are not included.

b. Surplus soil: Existing soil that is in excess of what is required for this work, including aggregates intended, but not used, for on-site mixing of concrete, mortars and paving. Contaminated soil meeting the definition of hazardous material or hazardous waste is not included.

c. Debris: Non-hazardous solid material generated during the construction, demolition, or renovation of a structure which exceeds 2.5 inch particle size that is: a manufactured object; plant or animal matter; or natural geologic material (e.g. cobbles and boulders), broken or removed concrete, masonry, and rock asphalt paving; ceramics; roofing paper and shingles. Inert materials may be reinforced with or contain ferrous wire, rods, accessories and weldments. A mixture of debris and other material such as soil or sludge is also subject to regulation as debris if the mixture is comprised primarily of debris by volume, based on visual inspection.

d. Wood: Dimension and non-dimension lumber, plywood, chipboard, hardboard. Treated and/or painted wood that meets the definition of lead contaminated or lead based contaminated paint is not included.

e. Scrap metal: Scrap and excess ferrous and non-ferrous metals such as reinforcing steel, structural shapes, pipe and wire that are recovered or collected and disposed of as scrap. Scrap metal meeting the definition of hazardous material or hazardous waste is not included.

f. Paint cans: Metal cans that are empty of paints, solvents, thinners and adhesives. If permitted by the paint can label, a thin dry film may remain in the can.

g. Recyclables: Materials, equipment and assemblies such as doors, windows, door and window frames, plumbing fixtures, glazing and mirrors that are recovered and sold as recyclable. Metal meeting the definition of lead contaminated or lead based paint contaminated may not be included as recyclable if sold to a scrap metal company. Paint cans may not be included as recyclable if sold to a scrap metal company.

h. Hazardous Waste: By definition, to be a hazardous waste a material must first meet the definition of a solid waste. Hazardous waste and hazardous debris are special cases of solid waste. They have additional regulatory controls and must be handled separately. They are thus defined separately in this document.

   Material not regulated as solid waste are: nuclear source or byproduct materials regulated under the Federal Atomic Energy Act of 1954 as amended; suspended or dissolved materials in domestic sewage effluent or irrigation return flows, or other regulated point source discharges; regulated air emissions; and fluids or wastes associated with natural gas or crude oil exploration or production.

1.2.3 Hazardous Debris

As defined in Solid Waste paragraph, debris that contains listed hazardous waste (either on the debris surface, or in its interstices, such as pore structure) per 40 CFR 261; or debris that exhibits a characteristic of hazardous waste per 40 CFR 261.

1.2.4 Chemical Wastes

This includes salts, acids, alkalizes, herbicides, pesticides, and organic chemicals.

1.2.5 Garbage

Refuse and scraps resulting from preparation, cooking, dispensing, and consumption of food.

1.2.6 Hazardous Waste

Any discarded material, liquid, solid, or gas, which meets the definition of hazardous material or is designated hazardous waste by the Environmental Protection Agency or State Hazardous Control Authority as defined in 40 CFR 260, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, 40 CFR 265, 40 CFR 266, 40 CFR 268, 40 CFR 270, 40 CFR 271, 40 CFR 272, 40 CFR 273, 40 CFR 279, and 40 CFR 280.

1.2.7 Hazardous Materials

Hazardous materials as defined in 49 CFR 171 and listed in 49 CFR 172.

Hazardous material is any material that:

a. Is regulated as a hazardous material per 49 CFR 173, or

b. Requires a Material Safety Data Sheet (MSDS) per 29 CFR 1910.120, or

c. During end use, treatment, handling, packaging, storage, transpiration, or disposal meets or has components that meet or have potential to meet the definition of a hazardous waste as defined by 40 CFR 261 Subparts A, B, C, or D.

Designation of a material by this definition, when separately regulated or controlled by other instructions or directives, does not eliminate the need for adherence to that hazard-specific guidance which takes precedence over this instruction for "control" purposes. Such material include ammunition,

weapons, explosive actuated devices, propellants, pyrotechnics, chemical and biological warfare materials, medical and pharmaceutical supplies, medical waste and infectious materials, bulk fuels, radioactive materials, and other materials such as asbestos, mercury, and polychlorinated biphenyls (PCBs). Nonetheless, the exposure may occur incident to manufacture, storage, use and demilitarization of these items.

1.2.8 Waste Hazardous Material (WHM)

Any waste material which because of its quantity, concentration, or physical, chemical, or infectious characteristics may pose a substantial hazard to human health or the environment and which has been so designated. Used oil not containing any hazardous waste, as defined above, falls under this definition.

1.2.9 Oily Waste

Those materials which are, or were, mixed with used oil and have become separated from that used oil. Oily wastes also means materials, including wastewaters, centrifuge solids, filter residues or sludges, bottom sediments, tank bottoms, and sorbents which have come into contact with and have been contaminated by, used oil and may be appropriately tested and discarded in a manner which is in compliance with other State and local requirements.

This definition includes materials such as oily rags, "kitty litter" sorbent clay and organic sorbent material. These materials may be land filled provided that:

a. It is not prohibited in other State regulations or local ordinances

b. The amount generated is "de minimus" (a small amount)

c. It is the result of minor leaks or spills resulting from normal process operations

d. All free-flowing oil has been removed to the practical extent possible

Large quantities of this material, generated as a result of a major spill or in lieu of proper maintenance of the processing equipment, are a solid waste. As a solid waste, a hazardous waste determination must be performed prior to disposal. As this can be an expensive process, it is recommended that this type of waste be minimized through good housekeeping practices and employee education.

1.2.10 Regulated Waste

Those solid waste that have specific additional Federal, state, or local controls for handling, storage, or disposal.

1.2.11 Class I Ozone Depleting Substance (ODS)

Class I ODS is defined in Section 602(a) of The Clean Air Act and includes the following chemicals:

chlorofluorocarbon-11 (CFC-11)
chlorofluorocarbon-12 (CFC-12)
chlorofluorocarbon-13 (CFC-13)
chlorofluorocarbon-111 (CFC-111)

chlorofluorocarbon-112 (CFC-112)
chlorofluorocarbon-113 (CFC-113)
chlorofluorocarbon-114 (CFC-114)
chlorofluorocarbon-115 (CFC-115)
chlorofluorocarbon-211 (CFC-211)
chlorofluorocarbon-212 (CFC-212)
chlorofluorocarbon-213 (CFC-213)
chlorofluorocarbon-214 (CFC-214)
chlorofluorocarbon-215 (CFC-215)
chlorofluorocarbon-216 (CFC-216)
chlorofluorocarbon-217 (CFC-217)
chlorofluorocarbon-500 (CFC-500)
chlorofluorocarbon-502 (CFC-502)
chlorofluorocarbon-503 (CFC-503)
halon-1211
halon-1301
halon-2402
carbon tetrachloride
methyl bromide
methyl chloroform

1.2.11.1 Universal Waste

The universal waste regulations streamline collection requirements for certain hazardous wastes in the following categories: batteries, pesticides, mercury-containing equipment (e.g., thermostats) and lamps (e.g., fluorescent bulbs). The rule is designed to reduce hazardous waste in the municipal solid waste (MSW) stream by making it easier for universal waste handlers to collect these items and send them for recycling or proper disposal. These regulations can be found at 40 CFR 273.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and Section 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Preconstruction Survey; G

Solid Waste Management Plan and Permit; G

Regulatory Notifications; G

Environmental Management Plan; G

Storm Water Pollution Prevention Plan; G

Air Emissions Source Specification Data; G

Dirt and Dust Control Plan

Contractor Hazardous Material Inventory Log; G

SD-06 Test Reports

Laboratory Analysis

Erosion and Sediment Control Inspection Reports

Storm Water Inspection Reports for General Permit

Contractor 40 CFR employee training records

Solid Waste Management Report; G

SD-11 Closeout Submittals

Some of the records listed below are also required as part of other submittals. For the "Records" submittal, maintain on-site a separate three-ring Environmental Records binder and submit at the completion of the project. Make separate parts to the binder corresponding to each of the applicable sub items listed below.

Storm Water Pollution Prevention Plan compliance notebook; G

Waste Determination Documentation

Disposal Documentation for Hazardous and Regulated Waste

Contractor 40 CFR Employee Training Records

Solid Waste Management Permit

Solid Waste Management Report

Contractor Hazardous Material Inventory Log; G

Hazardous Waste/Debris Management

Regulatory Notifications

1.4 ENVIRONMENTAL PROTECTION REQUIREMENTS

Provide and maintain, during the life of the contract, environmental protection as defined. Plan for and provide environmental protective measures to control pollution that develops during normal construction practice. Plan for and provide environmental protective measures required to correct conditions that develop during the construction of permanent or temporary environmental features associated with the project. Comply with Federal, State, and local regulations pertaining to the environment, including water, air, solid waste, hazardous waste and substances, oily substances, and noise pollution.

The Contractor may be required to promptly conduct tests and procedures for the purpose of assessing whether construction operations are in compliance with Applicable Environmental Laws. Analytical work shall be done by qualified laboratories; and where required by law, the laboratories shall be certified.

1.4.1 Environmental Compliance Assessment Training and Tracking System (ECATTS)

The QC Manager is responsible for environmental compliance on projects unless an Environmental Manager is named. The QC Manager (and alternative

QC Manager) or Environmental Manager shall complete ECATTS training prior to starting respective portions of on-site work under this contract. If personnel changes occur for any of these positions after starting work, replacement personnel shall complete ECATTS training within 14 days of assignment to the project.

Submit an ECATTS certificate of completion for personnel who have completed the required "Environmental Compliance Assessment Training and Tracking System (ECATTS)" training. This training is web-based and can be accessed from any computer with Internet access using the following instructions.

Register for NAVFAC Environmental Compliance Training and Tracking System, by logging on to http://navfac.ecatts.com/. Obtain the password for registration from the Contracting Officer.

This training has been structured to allow contractor personnel to receive credit under this contract and also to carry forward credit to future contracts. Contractors shall ensure that the QC Manager (and alternate QC Manager) or Environmental Manager review their training plans for new modules or updated training requirements prior to beginning work. Some training modules are tailored for specific State regulatory requirements; therefore, Contractors working in multiple states will be requires to re-take modules tailored to the state where the contract work is being performed.

ECATTS is available for use by all contractor and subcontractor personnel associated with this project. These other personnel are encouraged (but not required) to take the training and may do so at their discretion.

1.4.2 Conformance with the Environmental Management System

The Contractor shall perform work under this contract consistent with the policy and objectives identified in the installation's Environmental Management System (EMS). The Contractor shall perform work in a manner that conforms to objectives and targets, environmental programs and operational controls identified by the EMS. The Contractor will provide monitoring and measurement information as necessary to address environmental performance relative to environmental, engery, and transportation management goals. In the event an EMS nonconformance or environmental noncompliance associated with the contracted services, tasks, or actions occurs, the Contractor shall take corrective and/or preventative actions. In addition, the Contractor shall ensure that its employees are aware of their roles and responsibilities under the EMS and how these EMS roles and responsibilites affect work performed under the contract.

The Contractor is responsible for ensuring that their employees receive applicable environmental and occupational health and safety training, and keep up to date on regulatory required specific training for the type of work to be conducted onsite. All on-site Contractor personnel, and their subcontractor personnel, performing tasks that have the potential to cause a significant environmental impact shall be competent on the basis of appropriate education, training or experience. Upon contract award, the Contracting Officer's Representative will notify the installation's EMS coordinator to arrange EMS training. Refer to Section 01 57 19.01 20, Supplemental Temporary Environmental Controls for additional site specific EMS requirements related to construction. The installation's EMS coordinator shall identify training needs associated with environmental aspects and the EMS, and arrange training or take other action to meet these needs. The Contractor shall provide training documentation to the

Contracting Officer. The EMS coordinator shall retain associated records.

1.5 QUALITY ASSURANCE

1.5.1 Preconstruction Survey

Perform a Preconstruction Survey of the project site with the Contracting Officer, and take photographs showing existing environmental conditions in and adjacent to the site. Submit a report for the record.

1.5.2 Regulatory Notifications

The Contractor is responsible for all regulatory notification requirements in accordance with Federal, State and local regulations. In cases where the Navy must also provide public notification (such as stormwater permitting), the Contractor must coordinate with the Contracting Officer. The Contractor shall submit copies of all regulatory notifications to the Contracting Officer prior to commencement of work activities. Typically, regulatory notifications must be provided for the following (this listing is not all inclusive): demolition, renovation, NPDES defined site work, remediation of controlled substances (asbestos, hazardous waste, lead paint).

1.5.3 Environmental Brief

Attend an environmental brief to be included in the preconstruction meeting. Provide the following information: types, quantities, and use of hazardous materials that will be brought onto the activity; types and quantities of wastes/wastewater that may be generated during the contract. Discuss the results of the Preconstruction Survey at this time.

Prior to initiating any work on site, meet with the Contracting Officer and activity environmental staff to discuss the proposed Environmental Management Plan. Develop a mutual understanding relative to the details of environmental protection, including measures for protecting natural resources, required reports, required permits, permit requirements, and other measures to be taken.

1.5.4 Environmental Manager

Appoint in writing an Environmental Manager for the project site. The Environmental Manager will be directly responsible for coordinating contractor compliance with Federal, State, local, and station requirements. The Environmental Manager will ensure compliance with Hazardous Waste Program requirements (including hazardous waste handling, storage, manifesting, and disposal); implement the Environmental Management Plan; ensure that all environmental permits are obtained, maintained, and closed out; ensure compliance with Storm Water Program Management requirements; ensure compliance with Hazardous Materials (storage, handling, and reporting) requirements; and coordinate any remediation of regulated substances (lead, asbestos, PCB transformers). This can be a collateral position; however the person in this position must be trained to adequately accomplish the following duties: ensure waste segregation and storage compatibility requirements are met; inspect and manage Satellite Accumulation areas; ensure only authorized personnel add wastes to containers; ensure all Contractor personnel are trained in 40 CFR requirements in accordance with their position requirements; coordinate removal of waste containers; and maintain the Environmental Records binder and required documentation, including environmental permits compliance and

close-out.

1.5.5 Contractor 40 CFR Employee Training Records

Prepare and maintain employee training records throughout the term of the contract meeting applicable 40 CFR requirements. The Contractor will ensure every employee completes a program of classroom instruction or on-the-job training that teaches them to perform their duties in a way that ensures compliance with Federal, State and local regulatory requirements for RCRA Large Quantity Generator. The Contractor will provide a Position Description for each employee, by subcontractor, based on the Davis-Bacon Wage Rate designation or other equivalent method, evaluating the employee's association with hazardous and regulated wastes. This Position Description will include training requirements as defined in 40 CFR 265 for a Large Quantity Generator facility. Submit these training records to the Contracting Officer at the conclusion of the project, unless otherwise directed.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 ENVIRONMENTAL MANAGEMENT PLAN

Prior to initiating any work on site, the Contractor will meet with the Contracting Officer to discuss the proposed Environmental Protection Plan and develop a mutual understanding relative to the details of environmental protection, including measures for protecting natural resources, required reports, and other measures to be taken. The Contractor's Environmental Plan shall incorporate construction related objectives and targets from the installation's Environmental Management System. The Environmental Management Plan will be submitted in the following format and shall include the elements specified below.

a. Description of the Environmental Management Plan

(1) General overview and purpose

(a) A brief description of each specific plan required by environmental permit or elsewhere in this contract.

(b) The duties and level of authority assigned to the person(s) on the job site that oversee environmental compliance.

(c) A copy of any standard or project specific operating procedures that will be used to effectively manage and protect the environment on the project site.

(d) Communication and training procedures that will be used to convey environmental management requirements to contractor employees and subcontractors.

(e) Emergency contact information contact information (office phone number, cell phone number, and e-mail address).

(2) General site information

(3) A letter signed by an officer of the firm appointing the Environmental Manager and stating that he/she is responsible for managing and implementing the Environmental Program as described in this contract. Include in this letter the Environmental Manager's authority to direct the removal and replacement of non-conforming work.

b. Management of Natural Resources

(1) Land resources

(2) Tree protection

(3) Replacement of damaged landscape features

(4) Temporary construction

(5) Stream crossings

(6) Fish and wildlife resources

(7) Wetland areas

c. Protection of Historical and Archaeological Resources

(1) Objectives

(2) Methods

d. Storm Water Management and Control

(1) Ground cover

(2) Erodible soils

(3) Temporary measures

(a) Mechanical retardation and control of runoff

(b) Vegetation and mulch

(4) Effective selection, implementation and maintenance of Best Management Practices (BMPs).

e. Protection of the Environment from Waste Derived from Contractor Operations

(1) Control and disposal of solid and sanitary waste. If Section 01 74 19.05 20 is included in the contract, submit the plan required by that section as part of the Environmental Management Plan.

(2) Control and disposal of hazardous waste (Hazardous Waste Management Section)

This item will consist of the management procedures for all hazardous waste to be generated. The elements of those procedures will coincide with the Activity Hazardous Waste Management Plan. A copy of the Activity Hazardous Waste Management Plan will be provided by the Contracting Officer. As a minimum, include the

following:

(a) Procedures to be employed to ensure a written waste determination is made for appropriate wastes which are to be generated;

(b) Sampling/analysis plan;

(c) Methods of hazardous waste accumulation/storage (i.e., in tanks and/or containers);

(d) Management procedures for storage, labeling, transportation, and disposal of waste (treatment of waste is not allowed unless specifically noted);

(e) Management procedures and regulatory documentation ensuring disposal of hazardous waste complies with Land Disposal Restrictions (40 CFR 268);

(f) Management procedures for recyclable hazardous materials such as lead-acid batteries, used oil, and the like;

(g) Used oil management procedures in accordance with 40 CFR 279;

(h) Pollution prevention\hazardous waste minimization procedures;

(i) Plans for the disposal of hazardous waste by permitted facilities;

(j) Procedures to be employed to ensure all required employee training records are maintained.

f. Prevention of Releases to the Environment

(1) Procedures to prevent releases to the environment

(2) Notifications in the event of a release to the environment

g. Regulatory Notification and Permits

(1) List what notifications and permit applications must be made. Demonstrate that those permits have been obtained by including copies of all applicable, environmental permits.

3.1.1 Environmental Protection Plan Review

Within thirty days after the Contract award date, submit the proposed Environmental Management Plan for further discussion, review, and approval. Commencement of work will not begin until the environmental management plan has been approved.

3.1.2 Licenses and Permits

Obtain licenses and permits pursuant to the "Permits and Responsibilities" FAR Clause 52.236-7.

Only an air emissions permit will be obtained by the Contracting Officer.

Where required by the State regulatory authority, the inspections and

certifications will be provided through the services of a Professional Engineer (PE), registered in the State where the work is being performed. As a part of the quality control plan, which is required to be submitted for approval by the quality control section, provide a sub item containing the name, appropriate professional registration or licence number, address, and telephone number of the professionals or other qualified persons who will be performing the inspections and certifications for each permit.

3.2 PROTECTION OF NATURAL RESOURCES

Preserve the natural resources within the project boundaries and outside the limits of permanent work. Restore to an equivalent or improved condition upon completion of work. Confine construction activities to within the limits of the work indicated or specified. If the work is near streams, lakes, or other waterways, conform to the national permitting requirements of the Clean Water Act.

Do not disturb fish and wildlife. Do not alter water flows or otherwise significantly disturb the native habitat adjacent to the project and critical to the survival of fish and wildlife, except as indicated or specified.

Except in areas to be cleared, do not remove, cut, deface, injure, or destroy trees or shrubs without the Contracting Officer's permission. Do not fasten or attach ropes, cables, or guys to existing nearby trees for anchorages unless authorized by the Contracting Officer. Where such use of attached ropes, cables, or guys is authorized, the Contractor will be responsible for any resultant damage.

Protect existing trees which are to remain and which may be injured, bruised, defaced, or otherwise damaged by construction operations. Remove displaced rocks from uncleared areas. By approved excavation, remove trees with 30 percent or more of their root systems destroyed. Remove trees and other landscape features scarred or damaged by equipment operations, and replace with equivalent, undamaged trees and landscape features. Obtain Contracting Officer's approval before replacement.

The Contracting Officer's approval is required before any equipment will be permitted to ford live streams. In areas where frequent crossings are required, install temporary culverts or bridges. Obtain Contracting Officer's approval prior to installation. Remove temporary culverts or bridges upon completion of work, and repair the area to its original condition unless otherwise required by the Contracting Officer.

3.2.1 Erosion and Sediment Control Measures

3.2.1.1 Burnoff

Burnoff of the ground cover is not permitted.

3.2.1.2 Protection of Erodible Soils

Immediately finish the earthwork brought to a final grade, as indicated or specified. Immediately protect the side slopes and back slopes upon completion of rough grading. Plan and conduct earthwork to minimize the duration of exposure of unprotected soils.

3.2.1.3 Temporary Protection of Erodible Soils

Immediately finish the earthwork brought to a final grade, as indicated or specified. Immediately protect the side slopes and back slopes upon completion of rough grading. Plan and conduct earthwork to minimize the duration of exposure of unprotected soils. The Contractor is responsible for fully executing the plans and procedures approved in the Contractor's Erosion Control plan. Provide temporary protection of disturbed soils in accordance with North Carolina Sediment Control Commission (NCSCC), Erosion and Sediment Control Planning and Design Manual.

3.2.2 Erosion and Sediment Control Inspection Reports

Submit "Erosion and Sediment Control Inspection Reports" (E&S) (form provided at the pre-construction conference) and Storm Water Inspection Reports for General Permit NCG010000 - Land Disturbing Activities (form provided at http://h20.enr.state.nc.us/su/PDF_Files/SW_General_Permits/NCG01_Inspect_log.pdf) to the Contracting Officer once every 7 calendar days and within 24 hours of a storm event that produces 0.5 inch or more of rain.

Note erosion control inspection reports may be compiled as part of a stormwater pollution prevention plan inspection reports if applicable.

3.2.2.1 Storm Water Pollution Prevention Plan

In conjunction with the Contracting Officer, the Contractor shall apply for and obtain coverage under the North Carolina General Pollution Discharge and Elimination System General Permit for discharges of stormwater from Construction Activities, when 10,000 square feet or more, of land area is disturbed by construction or related construction support operations, including clearing, grubbing, grading, excavation, soil or gravel lay down areas, and demolition that exposes soil.

In North Carolina, the NPDES General Permit is issued with the Erosion and Sediment Control Permit; no separate application is necessary. Coverage under this permit required the D-B Contractor to prepare a financial responsibility/ownership form and forward to MCB Camp Lejeune for concurrence prior to submittal. In addition, the Contractor shall provide the permit fee to the North Carolina Department of Environmental and Natural Resources (NCDENR) before any land disturbing activities begin. The Contractor shall file for permit coverage on behalf of the Contracting Officer and himself and file a Notice of Termination once construction is complete and the site is stabilized with a final sustainable cover.

Under the terms and conditions of the permit, the Contractor may be required to install, inspect, maintain best management practices (BMPs), and submit stormwater BMP inspection reports and stormwater pollution prevention plan inspection reports. The Contractor shall ensure construction operations and management are constantly in compliance with the terms and conditions of the general permit for storm water discharges from construction activities.

a. The SWPPP shall:

(1) Identify potential sources of pollution which may be reasonably expected to affect the quality of storm water discharge from the site.

(2) Describe and ensure implementation of practices which will be used to reduce the pollutants in storm water discharge from the site.

(3) Ensure compliance with terms of the EPA or State general permit for storm water discharge.

(4) Select applicable best management practices from EPA 833-R-060-04.

(5) Include a completed copy of the Registration Statement, BMP Inspection Report Template and Notice of Termination except for the effective date.

3.2.2.2 Storm Water Pollution Prevention Plan Compliance Notebook

The contractor shall create and maintain a three ring binder of documents that demonstrate compliance with the Stormwater Construction Activity permit. The binder shall include a copy of the permit Registration Statement, proof of permit fee payment, SWPPP and SWPPP update amendments, inspection reports, copies of correspondence with the North Carolina Department of Environmental and Natural Resources (NCDENR) and a copy of the permit Notice of Termination. At the completion of the project the folder shall become the property of the Government. The compliance notebook shall be provided to Contracting Officer. An advance copy of the Registration Statement shall be provided to the Contracting Officer immediately after the form is presented to the permitting agency.

3.2.3 Stormwater Drainage and Construction Dewatering

There will be no discharge of excavation ground water to the sanitary sewer, storm drains, or to the river without prior specific authorization of the Environmental Division in writing. Discharge of hazardous substances will not be permitted under any circumstances.

Construction site runoff will be prevented from entering any storm drain or the river directly by the use of straw bales or other method suitable to the Environmental Division. Contractor will provide erosion protection of the surrounding soils.

Construction Dewatering shall not be discharged to the sanitary sewer. If the construction dewatering is noted or suspected of being contaminated, it may only be released to the storm drain system if the discharge is specifically permitted. Authorization for any contaminated groundwater release shall be obtained in advance from the base Environmental Officer. Discharge of hazardous substances will not be permitted under any circumstances.

3.2.4 Wetlands

Do not enter, disturb, destroy, or allow discharge of contaminants into any wetlands except as authorized herein. The protection of wetlands is the Contractor's responsibility. Authorization to enter specific wetlands identified will not relieve the Contractor from any obligation to protect other wetlands within, adjacent to, or in the vicinity of the construction site and associated boundaries. Contractor shall ensure wetland boundaries are clearly marked prior to any clearing and grubbing operations. The wetland delineation will be conducted on site by the design engineer with assistance as needed from the Army Corps of Engineers and the base Environmental Management Division.

3.2.5 Air Emissions Permit Application - Government Prepared

This contract may include the design and/or construction of regulated air emission sources that require an air quality permit for construction and operation in accordance with North Carolina Department of Environment and Natural Resources (NCDENR) Division of Air Quality (NCDAQ) permitting procedures. The government will prepare a permit application package for all applicable emission sources in the contract, however the contractor is required to coordinate submission of all Air Emissions Source Specification Data necessary for the preparation of the application package a minimum of 180 calendar days prior to any construction or installation of any emission source point associated with this project. Marine Corps Base, Camp Lejeune and Marine Corps Air Station, New River, have been issued one Clean Air Act Title V Construction and Operation Permit issued by NCDAQ. The facility is considered a major source for both criteria pollutants and federally listed Hazardous Air Pollutant (HAP). The facility is also subject to North Carolina Toxic Air Pollutant (TAP) regulations to include requirements for facility wide air dispersion modeling and facility fence line emission limits for certain pollutants. Typical emission sources requiring a permit include:

a. Boilers (Greater than 400,000 Btu/hr)

   (1) Boilers less than 10 MMBtu/hr are considered insignificant per NC regulations (15A NCAC 2Q.0503), but may still require analysis & permitting.

b. Storage Tanks

c. Fuel Dispensing

d. Emergency Generators

e. Non-Emergency Generators

f. Engine Testing Stations or Stands (where engine is removed from mobile vehicle/craft for testing)

g. Fire Training Pits

h. Woodworking/Grinding

i. Abrasive Blasting

j. Paint Stripping

k. Parts Cleaners/Ovens

l. Surface Coating (Paint Booths)

m. Epoxy Curing Benches

n. Remediation Systems

o. Welding/Soldering

p. Refrigerant Recovery/Recycling

3.2.5.1 Regulations Applicability

The permit application will require an evaluation of the applicability of the following regulations:

a. New Source Review (NSR) / Prevention of Significant Deterioration (PSD)(40 CFR 51, 40 CFR 52)

b. New Source Performance Standards (NSPS) (40 CFR 60)

(1) Possible source categories include but are not limited to boilers & internal combustion engines/generators

c. National Emission Standards for Hazardous Air Pollutants (NESHAP) (40 CFR 61,40 CFR 63)

(1) Possible source categories include but are not limited to Reciprocating Internal Combustion Engines (RICE)

d. North Carolina Air Toxics Program (15A NCAC 2D.1100, 2Q.0700)

(1) Many new air emission sources may require air dispersion modeling to receive a permit and/or demonstrate compliance. A draft rule is in the North Carolina regulatory process that would remove the exemption of combustion sources (e.g. boilers, generators) from the air toxics program effective for sources permitted after March 1, 2009 also requiring modeling for these types of sources. Once passed this will impose additional permitting requirements on the facility. As of May 2009 this rule had not been passed or finalized. Projects including combustion sources should be coordinated on a case-by-case basis with the NAVFAC IPT and the installation Environmental Management Division.

3.2.5.2 Type Of Permit Required

Based on preliminary review, it is not anticipated that new emission sources will require New Source Review (NSR) permitting; however, potential air emission rates for new emission sources may exceed Prevention of Significant Deterioration (PSD) thresholds, therefore PSD avoidance permit conditions and/or operating limits (e.g. fuel usage or operating hour limits).

3.2.5.3 Permit Application Package

The permit application package will include the following:

a. Clear, concise, & explanatory supporting documentation & narrative

b. Required permit application forms (Title V)

c. Air emissions calculations

d. Equipment drawings and specifications

e. Facility diagrams and/or maps

3.2.5.4 Time Allowance For Permit

The contractor should allow for approximately six months from the time of

permit application submission to permit issuance. Construction of an air emission source cannot begin without a permit or a waiver, and operation of the source cannot begin without a permit.

3.3 HISTORICAL AND ARCHAEOLOGICAL RESOURCES

Carefully protect in-place and report immediately to the Contracting Officer historical and archaeological items or human skeletal remains discovered in the course of work. Upon discovery, notify the Contracting Officer. Stop work in the immediate area of the discovery until directed by the Contracting Officer to resume work. The Government retains ownership and control over historical and archaeological resources.

3.4 SOLID WASTE MANAGEMENT PLAN and PERMIT

Provide to the contracting officer written notification of the quantity of solid waste/debris that is anticipated to be generated by construction. Include in the report the locations where various types of waste will be disposed or recycled. Include letters of acceptance or as applicable, submit one copy of a State and local Solid Waste Management Permit or license showing such agency's approval of the disposal plan before transporting wastes off Government property.

3.4.1 Solid Waste Management Report

Monthly, submit a solid waste disposal report to the Contracting Officer. For each waste, the report will state the classification (using the definitions provided in this section), amount, location, and name of the business receiving the solid waste.

The Contractor will include copies of the waste handling facilities' weight tickets, receipts, bills of sale, and other sales documentation. In lieu of sales documentation, the Contractor may submit a statement indicating the disposal location for the solid waste which is signed by an officer of the Contractor firm authorized to legally obligate or bind the firm. The sales documentation or Contractor certification will include the receiver's tax identification number and business, EPA or State registration number, along with the receiver's delivery and business addresses and telephone numbers. For each solid waste retained by the Contractor for his own use, the Contractor will submit on the solid waste disposal report the information previously described in this paragraph. Prices paid or received will not be reported to the Contracting Officer unless required by other provisions or specifications of this Contract or public law.

3.4.2 Control and Management of Solid Wastes

Pick up solid wastes, and place in covered containers which are regularly emptied. Do not prepare or cook food on the project site. Prevent contamination of the site or other areas when handling and disposing of wastes. At project completion, leave the areas clean. Recycling is encouraged and can be coordinated with the Contracting Officer and the activity recycling coordinator. Remove all solid waste (including non-hazardous debris) from Government property and dispose off-site at an approved landfill. Solid waste disposal off-site must comply with most stringent local, State, and Federal requirements including 40 CFR 241, 40 CFR 243, and 40 CFR 258.

Manage spent hazardous material used in construction, including but not limited to, aerosol cans, waste paint, cleaning solvents, contaminated

brushes, and used rags, as per environmental law.

3.5 WASTE DETERMINATION DOCUMENTATION

Complete a Waste Determination form (provided at the pre-construction conference) for all contractor derived wastes to be generated. Base the waste determination upon either a constituent listing from the manufacturer used in conjunction with consideration of the process by which the waste was generated, EPA approved analytical data, or laboratory analysis (Material Safety Data Sheets (MSDS) by themselves are not adequate). Attach all support documentation to the Waste Determination form. As a minimum, a Waste Determination form must be provided for the following wastes (this listing is not all inclusive): oil and latex based painting and caulking products, solvents, adhesives, aerosols, petroleum products, and all containers of the original materials.

3.6 CONTRACTOR HAZARDOUS MATERIAL INVENTORY LOG

Submit the "Contractor Hazardous Material Inventory Log"(found at: http://www.wbdg.org/ccb/NAVGRAPH/graphtoc.pdf), which provides information required by (EPCRA Sections 312 and 313) along with corresponding Material Safety Data Sheets (MSDS) to the Contracting Officer at the start and at the end of construction (30 days from final acceptance), and update no later than January 31 of each calendar year during the life of the contract. Documentation for any spills/releases, environmental reports or off-site transfers may be requested by the Contracting Officer.

3.6.1 Disposal Documentation for Hazardous and Regulated Waste

Manifest, pack, ship and dispose of hazardous or toxic waste and universal waste that is generated as a result of construction in accordance with the generating facilities generator status under the Recourse Conservation and Recovery Act. Contact the Contracting Officer for the facility RCRA identification number that is to be used on each manifest.

Submit a copy of the applicable EPA and or State permit(s), manifest(s), or license(s) for transportation, treatment, storage, and disposal of hazardous and regulated waste by permitted facilities. Hazardous or toxic waste manifest must be reviewed, signed, and approved by the Navy before the Contractor may ship waste. To obtain specific disposal instructions the Contractor must coordinate with the Activity environmental office. Refer to Section 01 57 19.01 20 for the Activity Point of Contact information.

3.7 POLLUTION PREVENTION/HAZARDOUS WASTE MINIMIZATION

Minimize the use of hazardous materials and the generation of hazardous waste. Include procedures for pollution prevention/ hazardous waste minimization in the Hazardous Waste Management Section of the Environmental Management Plan. Consult with the activity Environmental Office for suggestions and to obtain a copy of the installation's pollution prevention/hazardous waste minimization plan for reference material when preparing this part of the plan. If no written plan exists, obtain information by contacting the Contracting Officer. Describe the types of the hazardous materials expected to be used in the construction when requesting information.

3.8 WHM/HW MATERIALS PROHIBITION

No waste hazardous material or hazardous waste shall be disposed of on government property. No hazardous material shall be brought onto government property that does not directly relate to requirements for the performance of this contract. The government is not responsible for disposal of Contractor's waste material brought on the job site and not required in the performance of this contract. The intent of this provision is to dispose of that waste identified as waste hazardous material/hazardous waste as defined herein that was generated as part of this contract and existed within the boundary of the Contract limits and not brought in from offsite by the Contractor. Incidental materials used to support the contract including, but not limited to aerosol cans, waste paint, cleaning solvents, contaminated brushes, rags, clothing, etc. are the responsibility of the Contractor. The list is illustrative rather than inclusive. The Contractor is not authorized to discharge any materials to sanitary sewer, storm drain, or to the river or conduct waste treatment or disposal on government property without written approval of the Contracting Officer.

3.9 HAZARDOUS MATERIAL MANAGEMENT

No hazardous material shall be brought onto government property that does not directly relate to requirements for the performance of this contract.

Include hazardous material control procedures in the Safety Plan. Address procedures and proper handling of hazardous materials, including the appropriate transportation requirements. Submit a MSDS and estimated quantities to be used for each hazardous material to the Contracting Officer prior to bringing the material on base. Typical materials requiring MSDS and quantity reporting include, but are not limited to, oil and latex based painting and caulking products, solvents, adhesives, aerosol, and petroleum products. At the end of the project, provide the Contracting Officer with the maximum quantity of each material that was present at the site at any one time, the dates the material was present, the amount of each material that was used during the project, and how the material was used. Ensure that hazardous materials are utilized in a manner that will minimize the amount of hazardous waste that is generated. Ensure that all containers of hazardous materials have NFPA labels or their equivalent. Keep copies of the MSDS for hazardous materials on site at all times and provide them to the Contracting Officer at the end of the project. Certify that all hazardous materials removed from the site are hazardous materials and do not meet the definition of hazardous waste per 40 CFR 261.

3.10 PETROLEUM PRODUCTS AND REFUELING

Conduct the fueling and lubricating of equipment and motor vehicles in a manner that protects against spills and evaporation. Manage all used oil generated on site in accordance with 40 CFR 279. Determine if any used oil generated while on-site exhibits a characteristic of hazardous waste. Used oil containing 1000 parts per million of solvents will be considered a hazardous waste and disposed of at Contractor's expense. Used oil mixed with a hazardous waste will also be considered a hazardous waste.

3.10.1 Oily and Hazardous Substances

Prevent oil or hazardous substances from entering the ground, drainage areas, or navigable waters. In accordance with 40 CFR 112, surround all

temporary fuel oil or petroleum storage tanks with a temporary berm or containment of sufficient size and strength to contain the contents of the tanks, plus 10 percent freeboard for precipitation. The berm will be impervious to oil for 72 hours and be constructed so that any discharge will not permeate, drain, infiltrate, or otherwise escape before cleanup occurs.

3.10.2 Inadvertent Discovery of Petroleum Contaminated Soil or Hazardous Wastes

If petroleum contaminated soil or suspected hazardous waste is found during construction that was not identified in the contract documents, the contractor shall immediately notify the contracting officer. The contractor shall not disturb this material until authorized by the contracting officer.

3.11 FUEL TANKS

Petroleum products and lubricants required to sustain up to 30 days of construction activity may be kept on site. Storage and refilling practices shall comply with 40 CFR 112. Secondary containment shall be provided and be no less than 110 percent of the tank volume plus five inches of free-board. If a secondary berm is used for containment then the berm shall be impervious to oil for 72 hours and be constructed so that any discharge will not permeate, drain, infiltrate, or otherwise escape before cleanup occurs. Drips pans are required and the tanks must be covered during inclement weather.

3.12 RELEASES/SPILLS OF OIL AND HAZARDOUS SUBSTANCES

Exercise due diligence to prevent, contain, and respond to spills of hazardous material, hazardous substances, hazardous waste, sewage, regulated gas, petroleum, lubrication oil, and other substances regulated by environmental law. Maintain spill cleanup equipment and materials at the work site. In the event of a spill, take prompt, effective action to stop, contain, curtail, or otherwise limit the amount, duration, and severity of the spill/release. In the event of any releases of oil and hazardous substances, chemicals, or gases; immediately (within 15 minutes) notify the Base or Activity Fire Department, the activity's Command Duty Officer, and the Contracting Officer. If the contractor's response is inadequate, the Navy may respond. If this should occur, the contractor will be required to reimburse the government for spill response assistance and analysis.

The Contractor is responsible for verbal and written notifications as required by the federal 40 CFR 355, State, local regulations and Navy Instructions. Spill response will be in accordance with 40 CFR 300 and applicable State and local regulations. Contain and clean up these spills without cost to the Government. If Government assistance is requested or required, the Contractor will reimburse the Government for such assistance. Provide copies of the written notification and documentation that a verbal notification was made within 20 days.

Maintain spill cleanup equipment and materials at the work site. Clean up all hazardous and non-hazardous (WHM) waste spills. The Contractor shall reimburse the government for all material, equipment, and clothing generated during any spill cleanup. The Contractor shall reimburse the government for all costs incurred including sample analysis materials, equipment, and labor if the government must initiate its own spill cleanup

procedures, for Contractor responsible spills, when:

a. The Contractor has not begun spill cleanup procedure within one hour of spill discovery/occurrence, or

b. If, in the government's judgment, the Contractor's spill cleanup is not adequately abating life threatening situation and/or is a threat to any body of water or environmentally sensitive areas.

3.13 CONTROL AND MANAGEMENT OF HAZARDOUS WASTES

3.13.1 Facility Hazardous Waste Generator Status

MCB Camp Lejeune is designated as a Large Quantity Generator. All work conducted within the boundaries of this activity must meet the regulatory requirements of this generator designation. The Contractor will comply with all provisions of Federal, State and local regulatory requirements applicable to this generator status regarding training and storage, handling, and disposal of all construction derived wastes.

3.13.2 Hazardous Waste/Debris Management

Identify all construction activities which will generate hazardous waste/debris. Provide a documented waste determination for all resultant waste streams. Hazardous waste/debris will be identified, labeled, handled, stored, and disposed of in accordance with all Federal, State, and local regulations including 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, 40 CFR 265, 40 CFR 266, and 40 CFR 268.

Hazardous waste will also be managed in accordance with the approved Hazardous Waste Management Section of the Environmental Protection Plan. Store hazardous wastes in approved containers in accordance with 49 CFR 173 and 49 CFR 178. Hazardous waste generated within the confines of Government facilities will be identified as being generated by the Government.

Prior to removal of any hazardous waste from Government property, all hazardous waste manifests must be signed by activity personnel from the Station Environmental Office. No hazardous waste will be brought onto Government property. Provide to the Contracting Officer a copy of waste determination documentation for any solid waste streams that have any potential to be hazardous waste or contain any chemical constituents listed in 40 CFR 372-SUBPART D. For hazardous wastes spills, verbally notify the Contracting Officer immediately.

3.13.2.1 Regulated Waste Storage/Satellite Accumulation/90 Day Storage Areas

If the work requires the temporary storage/collection of regulated or hazardous wastes, the Contractor will request the establishment of a Regulated Waste Storage Area, a Satellite Accumulation Area, or a 90 Day Storage Area at the point of generation. The Contractor must submit a request in writing to the Contracting Officer providing the following information:

Contract Number	_____	Contractor	_____
Haz/Waste or Regulated Waste POC	_____	Phone Number	_____

Type of Waste _____ Source of Waste _____

Emergency POC _____ Phone Number _____

Location of the Site: _____
(Attach Site Plan to the Request)

Attach a waste determination form. Allow ten working days for processing this request. The designated area where waste is being stored shall be barricaded and a sign identifying as follows:

"DANGER - UNAUTHORIZED PERSONNEL KEEP OUT"

3.13.2.2 Sampling and Analysis of HW

a. Waste Sampling

Sample waste in accordance with EPA 530/F-93/004. Each sampled drum or container will be clearly marked with the Contractor's identification number and cross referenced to the chemical analysis performed.

b. Laboratory Analysis

Follow the analytical procedure and methods in accordance with the 40 CFR 261. The Contractor will provide all analytical results and reports performed to the Contracting Officer.

c. Analysis Type

Identify waste hazardous material/hazardous waste by analyzing for the following properties as a minimum: ignitability, corrosiveness, total chlorides, BTU value, PCBs, TCLP for heavy metals, and cyanide.

3.13.2.3 Asbestos Certification

Items, components, or materials disturbed by or included in work under this contract may involve asbestos. Other materials in the general area around where work will be performed may contain asbestos. All thermal insulation, in all work areas, should be considered to be asbestos unless positively identified by conspicuous tags or previous laboratory analysis certifying them as asbestos free.

Inadvertent discovery of non-disclosed asbestos that will result in an abatement action requires a change in scope before proceeding. Upon discovery of asbestos containing material not identified in the contract documents, the Contractor shall immediately stop all work that would generate further damage to the material, evacuate the asbestos exposed area, and notify the Contracting Officer for resolution of the situation prior to resuming normal work activities in the affected area. The Contractor will not remove or perform work on any asbestos containing materials without the prior approval of the Contracting Officer. The Contractor will not engage in any activity, which would remove or damage such materials or cause the generation of fibers from such materials.

Asbestos containing waste shall be managed and disposed of in accordance with applicable environmental law. Asbestos containing waste shall be manifested and the manifest provided to the Contracting Officer.

3.13.2.4 Hazardous Waste Disposal

No hazardous, toxic, or universal waste shall be disposed or hazardous material abandoned on government property. And unless otherwise other wise noted in this contract, the government is not responsible for disposal of Contractor generated waste material. The disposal of incidental materials used to accomplish the work including, but not limited to aerosol cans, waste paint, cleaning solvents, contaminated brushes, rags, clothing, etc. are the responsibility of the Contractor. The list is illustrative rather than inclusive.

The Contractor is not authorized to discharge any materials to sanitary sewer, storm drain, or water way or conduct waste treatment or disposal on government property without written approval of the Contracting Officer.

Control of stored waste, packaging, sampling, analysis, and disposal will be determined by the details in the contract. The requirements for jobs in the following paragraphs will be used as the guidelines for disposal of any hazardous waste generated.

a. Responsibilities for Contractor's Disposal

Contractor responsibilities include any generation of WHM/HW requiring Contractor disposal of solid waste or liquid.

(1) The Contractor agrees to provide all service necessary for the final treatment/disposal of the hazardous material/waste in accordance with all local, State and Federal laws and regulations, and the terms and conditions of the contract within sixty (60) days after the materials have been generated. These services will include all necessary personnel, labor, transportation, packaging, detailed analysis (if required for disposal, and/or transportation, including manifesting or completing waste profile sheets, equipment, and the compilation of all documentation is required).

(2) Contain all waste in accordance with 40 CFR 260, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, 40 CFR 265, 40 CFR 266, 40 CFR 268, 40 CFR 270, 40 CFR 272, 40 CFR 273, 40 CFR 279, 40 CFR 280, and 40 CFR 761.

(3) Obtaining a representative sample of the material generated for each job done to provide waste stream determination.

(4) Analyzing for each sample taken and providing analytical results to the Contracting Officer. Provide two copies of the results.

(5) Determine the DOT proper shipping names for all waste (each container requiring disposal) and will demonstrate how this determination is developed and supported by the sampling and analysis requirements contained herein to the Contracting Officer.

Contractor Disposal Turn-In Requirements

For any waste hazardous materials or hazardous waste generated which requires the Contractor to dispose of, the following conditions must be complied with in order to be acceptable for disposal:

a. Drums compatible with waste contents and drums meet DOT requirements

for 49 CFR 173 for transportation of materials.

b. Drums banded to wooden pallets. No more than three (3) 55 gallon drums to a pallet, or two (2) 85 gallon over packs.

c. Band using 1-1/4 inch minimum band on upper third of drum.

d. Recovery materials label (provided by Code 106.321) located in middle of drum, filled out to indicate actual volume of material, name of material manufacturer, other vendor information as available.

e. Always have three (3) to five (5) inches of empty space above volume of material. This space is called 'outage'.

3.13.3 Class I ODS Prohibition

Class I ODS as defined and identified herein will not be used in the performance of this contract, nor be provided as part of the equipment. This prohibition will be considered to prevail over any other provision, specification, drawing, or referenced documents. Regulations related to the protection of stratosphere ozone may be found in 40 CFR 82.

Heating and air conditioning technicians must be certified through an EPA-approved program. Copies of certifications shall be maintained at the employees' place of business and be carried as a wallet card by the technician, as provided by environmental law. Accidental venting of a refrigerant is a release and shall be reported to the Contracting Officer.

3.13.3.1 Universal Waste/e-Waste Management

Universal waste including but not limited to some mercury containing building products such florescent lamps, mercury vapor lamps, high pressure sodium lamps, CRTs, batteries, aerosol paint containers, electrical equipment containing PCBs, and consumed electronic devices, shall be managed in accordance with applicable environmental law and installation instructions.

3.14 DUST CONTROL

Keep dust down at all times, including during nonworking periods. Sprinkle or treat, with dust suppressants, the soil at the site, haul roads, and other areas disturbed by operations. Dry power brooming will not be permitted. Instead, use vacuuming, wet mopping, wet sweeping, or wet power brooming. Air blowing will be permitted only for cleaning nonparticulate debris such as steel reinforcing bars. Only wet cutting will be permitted for cutting concrete blocks, concrete, and bituminous concrete. Do not unnecessarily shake bags of cement, concrete mortar, or plaster.

3.14.1 Dirt and Dust Control Plan

Submit truck and material haul routes along with a plan for controlling dirt, debris, and dust on base roadways. As a minimum, identify in the plan the subcontractor and equipment for cleaning along the haul route and measures to reduce dirt, dust, and debris from roadways.

3.15 NOISE

Make the maximum use of low-noise emission products, as certified by the EPA. Blasting or use of explosives will not be permitted without written

permission from the Contracting Officer, and then only during the designated times. Confine pile-driving operations to the period between 8 a.m. and 4 p.m., Monday through Friday, exclusive of holidays, unless otherwise specified.

3.16 MERCURY MATERIALS

Mercury is prohibited in the construction of this facility, unless specified otherwise, and with the exception of mercury vapor lamps and fluorescent lamps. Dumping of mercury-containing materials and devices such as mercury vapor lamps, fluorescent lamps, and mercury switches, in rubbish containers is prohibited. Remove without breaking, pack to prevent breakage, and transport out of the activity in an unbroken condition for disposal as directed. Immediately report to the Environmental Office and the Contracting Officer instances of breakage or mercury spillage. Clean mercury spill area to the satisfaction of the Contracting Officer.

Cleanup of a mercury spill shall not be recycled and shall be managed as a hazardous waste for disposal.

-- End of Section --

SECTION 01 57 19.01 20

SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS
12/09

PART 1 GENERAL

1.1 REGIONAL REQUIREMENTS

1.1.1 Mid-Atlantic

1.1.1.1 North Carolina

a. MCB Camp Lejeune

(1) Removal of Waste from Camp Lejeune

Remove and dispose of rubbish and debris from Government property.

(a.) Provide 24-hour advance written notice to the Contracting Office of Contractor's intention to dispose of off base.

(b.) Disposal at sites or landfills not holding a valid state of North Carolina permit is specifically prohibited. The prohibition also applies to sites where a permit my have been applied for but not yet obtained.

(c.) Off-base disposal of construction debris outside the parameters of this paragraph at site without State permits and/or not in accordance with regulatory requirements will require the Contractor at his own expense to remove, transport and relocate the debris to a State approved site. The Contractor will also be required to pay any fines, penalties, or fees related to the illegal disposal of construction debris.

(d.) Metal will not be accepted at the Base Sanitary Landfill. Materials which may be deposited in the landfill include:

CATEGORY	**CONSTRUCTION DEBRIS DISPOSAL - BASE SANITARY LANDFILL EXAMPLE/GENERAL INFORMATION FOR DEPOSIT IN THE LANDFILL**
Masonry and Concrete	Deliver concrete, block, brick, mortar to the landfill separate from any other items, and place in a location designated by the landfill operator. Reinforcement wire and rebar will be removed flush with exposed surfaces.
Recyclable Cardboard	Breakdown corrugated cardboard boxes and deliver to the Base Recycling Center located at Building 913. If Base personnel rejects the cardboard, remove from government property.
Non-recyclable Wall Pallets	Deliver usable pallets to the Base Recycling Center located at Building 913. If base

	personnel rejects the pallets, remove from government property.
Untreated/Unpainted Wood	Deliver lumber, trees, stumps, limbs, tops, and shrubs to the landfill separated from any other items, and place in locations as designated by landfill operator.
Organic Matter	Deliver leaves, pine straw, and grass clippings to the landfill separated from any other items, and place in locations as designated by landfill operator. No bags or containers are allowed.
Asphalt Pavement	Remove pavement from Government property and deliver to an asphalt-recycling establishment. Provide a record of the total tons of asphalt recycled and the corporate name and location of the recycling establishment receiving the removed asphalt.
Asbestos	Asbestos will be accepted at the landfill.
Lead Based Paint and Materials	Well adhered lead containing paint debris as whole unit removal, will be accepted at the base landfill. Lead scrapping chips from areas identified within the contract scope, after TCLP testing, will be disposed of at the base landfill if under 5 ppm; over 5 ppm is considered hazardous and will require manifesting per EMD rules and disposal off base at a certified, licensed disposal site.
Metals	Metals will not be accepted at the landfill. Remove metals from each and every category before delivery to the landfill. (Example: Remove hardware from doors and windows.) Dispose of metal construction debris at Defense Reutilization Maintenance Office (DRMO) Building TC-861, Camp Geiger.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

-- End of Section --

SECTION 01 74 19.05 20

CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT FOR DESIGN-BUILD
11/07

PART 1 GENERAL

1.1 GOVERNMENT POLICY

Government policy is to apply sound environmental principles in the design, construction and use of facilities. As part of the implementation of that policy the Contractor shall: (1) practice efficient waste management when sizing, cutting, and installing products and materials and (2) use all reasonable means to divert construction and demolition waste from landfills and incinerators and to facilitate their recycling or reuse.

1.2 PLAN

A waste management plan shall be submitted within 15 days after notice to proceed and prior to initiating any site preparation work. The plan shall include the following:

a. Name of individuals on the Contractor's staff responsible for waste prevention and management.

b. Actions that will be taken to reduce solid waste generation.

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

d. Characterization, including estimated types and quantities, of the waste to be generated.

e. Name of landfill and/or incinerator to be used and the estimated costs for use, assuming that there would be no salvage or recycling on the project.

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

g. List of specific waste materials that will be salvaged for resale, salvaged and reused, or recycled. Recycling facilities that will be used shall be identified.

h. Identification of materials that cannot be recycled/reused with an explanation or justification.

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

1.3 RECORDS

Records shall be maintained to document the quantity of waste generated; the quantity of waste diverted through sale, reuse, or recycling; and the quantity of waste disposed by landfill or incineration. The records shall be made available to the Contracting Officer during construction, and a copy of the records shall be delivered to the Contracting Officer upon completion of the construction.

1.4 DISPOSAL

Except as otherwise specified in other sections of the specifications, disposal shall be in accordance with the following:

1.4.1 Reuse.

First consideration shall be given to salvage for reuse since little or no re-processing is necessary for this method, and less pollution is created when items are reused in their original form. Sale or donation of waste suitable for reuse shall be considered. Salvaged materials, other than those specified in other sections to be salvaged and reinstalled, shall not be used in this project.

1.4.2 Recycle.

Waste materials not suitable for reuse, but having value as being recyclable, shall be made available for recycling whenever economically feasible.

1.4.3 Waste.

Materials with no practical use or economic benefit shall be disposed at a landfill or incinerator.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

SECTION 01 78 24.05 20

FACILITY OPERATION AND MAINTENANCE SUPPORT INFORMATION
11/07

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

This section provides the requirements for operation and maintenance support information (OMSI). OMSI contains detailed as-built information describing the efficient, economical and safe operation and maintenance, and repair of the facility. OMSI is provided as hard copy, manuals, .pdf files, and computerized maintenance management system (CMMS) data. The OMSI is to be factual, concise, comprehensive and written to be easily used by maintenance personnel. Descriptive matter and theory must include technical details that are essential for a comprehensive understanding of the operation, maintenance and repair of the system. The OMSI preparer shall ensure that OMSI reflect changes to systems and equipment, made during construction. The words "system", "systems", and "equipment", when used in this document refer to as-built systems and equipment.

1.1.1 Organization of OMSI

Prepare the OMSI in three parts. PART I - Facility Information, PART II - Primary Systems Information, and PART III - Product Data. Cross-referencing within or between OMSI Parts must be specific.

1.1.2 Sources of Data

The sources of data needed to prepare the OMSI include but are not limited to, the design plans and specifications, field visits, approved construction submittals and manufacturer's catalog data for materials, methods, and systems used in this contract.

1.1.3 OMSI Units of Measure

Provide OMSI utilizing the units of measure required by the RFP, Refer to UFGS Section 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES. Metric OMSI shall be in SI (System International) metric units exclusively.

1.1.4 Schedule of Operation and Maintenance Data Packages

Refer to UFGS Section 01 78 23 OPERATION AND MAINTENANCE DATA, located at the website location: http://www.wbdg.org/ccb for descriptions of SD-10, Operation and Maintenance Data packages, when referenced in Part 5, PRESCRIPTIVE SPECIFICATIONS, or in other UFGS sections. Submit Operation and Maintenance Manuals in accordance with this section, Section 01 78 24.05 20 FACILITY OPERATION AND MAINTENANCE SUPPORT INFORMATION. When using UFGS Sections that reference Section 01 78 23 OPERATION AND MAINTENANCE DATA, change reference to Section 01 78 24.05 20 FACILITY OPERATION AND MAINTENANCE SUPPORT INFORMATION.

1.2 SUBMITTALS

The use of a "G" following a submittal indicates that a Government approval action is required. Submit the following in accordance with Section 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES and Section 01 33 00.05 20

CONSTRUCTION SUBMITTAL PROCEDURES.

SD-06 Test Reports

Validation Site Visit and Presentation; G

SD-11 Closeout Submittals

OMSI, Preliminary Submittal; G

OMSI, 100% - Prefinal Submittal; G

OMSI, Final Submittal; G

1.3 SUBMITTAL FORMAT

1.3.1 Hard Copies

Bind the OMSI in durable, hard cover, three-ring, water and grease resistant binders, which hold 8.5" X 11" sheets. Binders shall have clear pockets located on the front and on the spine that hold printed sheets. Parts I, II, and III are separate binders with white, blue, and red spine inserts (respectively). Use high quality paper and dividers of heavy-duty paper with plastic reinforced holes and integrated tabs. Tabs must be of varying size and color to distinguish organization. Use plain tabs to show the UNIFORMAT II number and title in Part III, Product Data. Provide a Master Table of Contents for each OMSI binder. Identify each binder on both the cover insert sheet and the spine insert sheet with the following information:

1. OMSI Part I, II or III with appropriate titles
2. Building Number
3. Project Title
4. Activity and Location
5. Construction Contract Number
6. Prepared For: (Contracting Agency)
7. Prepared By
8. Volume Number - Each binder is a single volume. Number each volume consecutively.

1.3.2 Electronic Format (PDF)

Provide the OMSI on Compact Disk using Adobe Acrobat 7.0 or similar software capable of producing PDF (Portable Document Format) files. The PDF file is duplicate of the hard copy format. The PDF files shall be indexed by part (Facility Information, Primary Systems Information, and Product Data) and each entry identified in the table of contents.

1.3.3 Computerized Maintenance Management System (CMMS) Data

Provide data in format that can be imported into Single Platform Maximo CMMS.

1.4 SUBMITTAL REQUIREMENTS

1.4.1 Preliminary Submittal

Submit the Preliminary submittal when construction is 50% complete. Provide two hard copies to the Contracting Officer. Present the submittal

in sufficient detail to evaluate the data collection and arrangement process. One of these copies, reviewed by the Contracting Officer, with review comments, will be returned to the Contractor for preparation of the 100% submittal. Include in the submittal, as a minimum, all available Part I, Facility Information; all systems of Part II, Primary Systems Information (at least one system shall be essentially complete and the remaining systems shall be at least 50% complete); and at least two divisions of Part III, Product Data.

1.4.2 100% - Prefinal Submittal

Provide two hard copies to the Contracting Officer. The 100% - Prefinal submittal is due 30 days prior to Beneficial Occupancy Date (BOD). This submittal shall be a complete, working document that can be used to operate and maintain the facility.

1.4.3 Final Submittal

Provide two hard copies and two sets of electronically formatted information to the Contracting Officer 30 days prior to the Beneficial Occupancy Date (BOD). The final submittal is due 90 days after BOD. Include the final submittal in the Construction Schedule.

PART 2 PRODUCTS

2.1 DESCRIPTION OF WORK

2.1.1 OMSI Part I - Facility Information

a. General Facility and System Description - Describe the function of the facility. Detail the overall dimensions of the facility, number of floors, foundation type, expected number of occupants, and facility Category Code. List and generally describe all the facility systems listed in Part II, Primary Systems Information and any special building features (for example, HVAC Controls, Sprinkler Systems, cranes, elevators, and generators). Include photographs marked up and labeled to show key operating components and the overall facility appearance. Include a copy of the final "Completion Certification" which certifies completion and compliance of construction by the Contractor. This documentation will be provided by the Construction Quality Control Manager.

b. Basis of Design - Include the Basis of Design that shows the basic design scope of work, assumptions and the original intentions of the design A/E. Include a copy of the final "Design Quality Control Report Certification" which verifies conformance of the project design to the Request for Proposal. The Commissioning Authority or the Designer of Record will provide this documentation.

c. Safety Hazards - List all residual hazards identified in the Requirements Hazard Analysis as prepared by the design A/E. Provide recommended safeguards for each identified hazard.

d. Floor Plans - Provide uncluttered, legible 11" x 17" floor plans. Include only room numbers, type or function of spaces, and overall facility dimensions on the floor plans. Do not include construction instructions, references, frame numbers, etc.

e. Utility Connection and Cutoff Plans - Provide utility site plans and floor plans that indicate the main interior and exterior connection and

cutoff points for all utilities. Include enough information to enable someone unfamiliar with the facility to locate the connection and cutoff points. Indicate the room number, panel number, circuit breaker, valve number, etc., of each connection and cutoff point, and what that connection and cutoff point controls. These plans are in addition to Floor plans.

f. Equipment Warranty Tags and Guarantor's Local Representative - Provide with each warranty the name, address, and telephone number of the guarantor's representative nearest to the location where the equipment and appliances are installed. The guarantor's representative, upon request of the station representative, shall honor the warranty during the warranty period, and shall provide the services prescribed by the terms of the warranty. At the time of installation, tag each item of warranted equipment with a durable, oil- and water-resistant tag approved by the Contracting Officer. Attach tag with copper wire and spray with a clear silicone waterproof coating. Leave the date of acceptance and QC's signature blank until project is accepted for beneficial occupancy. Tag shall show the following information:

EQUIPMENT/PRODUCT WARRANTY TAG

Type of Equipment/Product _____
Warranty Period _____ From _____ To _____
Contract No. _____
Inspector's Signature _____ Date Accepted _____

Contractor:
Name: _____
Address: _____
Telephone: _____

Warranty Contact: _____
Name: _____
Address: _____
Telephone: _____

STATION PERSONNEL TO PERFORM ONLY OPERATIONAL MAINTENANCE

g. Extended Warranty Information - List and include copies of all warranties for products, equipment, components, and subcomponents whose duration exceeds one year. Cross-reference the list to the warranty copies included in Part III, Product Data. For each warranty listed indicate the applicable specification section, duration, start date, end date, and the point of contact for warranty fulfillment. Also, list or reference all specific operation and maintenance procedures that must be performed to keep the warranty valid.

h. Equipment and Warranty Tags Listing - Provide a table that lists the major equipment shown on the design equipment schedules and written warranties for equipment/products provided. Show the item descriptions, warranty information, locations, model numbers; and the names, addresses, and telephone numbers of the manufacturers, suppliers, contractor and subcontractors.

i. HVAC Filters - Provide a table that lists the quantity, type, size, and location of each HVAC filter.

j. Floor Coverings, Wall Surfaces, Ceiling Surfaces - Provide a table that lists by room number (including hallways and common spaces), the type, and

area of finish. The table will include a facility summary of the total area for each type of space and floor, wall, or ceiling finish.

k. Windows - Provide a table that lists by room number (including hallways and common spaces), the type of window, window size, number of each size and type, and special features. The table will include a facility summary of the total number for each type and size of window.

l. Light Fixtures - Provide a table that lists by room number (including hallways and common spaces), type of light fixture, number of light fixtures, type of bulbs or tubes, and number of bulbs or tubes. The table will include a facility summary of the total number of fixtures of each type and number of bulbs or tubes of each type.

m. Plumbing Fixtures - Provide a table that lists by room number, the number and type of plumbing and bathroom plumbing fixtures (for example, sinks, toilets, urinals, showers and drinking fountains).

n. Roofing - Provide the total area of each type of roof surface and system. Provide the name of the roofing product and system; manufacturer's, supplier's, and installer's names, addresses, and phone numbers. For each type of roof, provide a recommended inspection, maintenance and repair schedule that details checkpoints, frequencies, and prohibited practices. List roof structural load limits.

2.1.2 Part II - Primary Systems Information

OMSI Part II, Primary Systems Information requires using a systems approach. This approach requires that consideration be given to the entire system (that is, the interfaces of equipment, connections and material flow within the system). Use Notes, Cautions and Warnings throughout the Part II, Primary Systems Information to emphasize important and critical instructions and procedures.

OMSI Part II, Primary Systems Information are required for the primary systems listed below;

1. Domestic water pressure boosting system

2. Plumbing systems, including temperature actuated thermostatic water mixing valve

3. HVAC systems, including chillers, boilers, heat pumps, air handling equipment, exhaust fans, fan coil units, VAV boxes, heart recovery wheels, hot and chilled water hydronic systems, control valves, and backflow preventers.

4. Direct Digital Controls/Space Temperature Controls

5. Steam condensate Pumps, Steam PRV valves.

6. Electrical systems, including transformers, diesel electric generator sets, automatic transfer switches, primary switchgear, secondary switchgear, high voltage switches, variable frequency drives, and frequency converters

7. Fire protection systems, and fire alarm and detection systems

8. Site mechanical utilities, including cathodic protection

9. Site electrical utilities, including substations, transformers, and pad mounted switchgear

10. Wastewater pumping stations.

For each system, address;

a. Operation

(1) System Description - Provide a detailed discussion of the system composition and operation. Include technical details that are essential for an understanding of the system.

(2) Start-Up and Shutdown Procedures - Provide step by step instructions to bring systems from static to operational configurations and from operating to shutdown status.

(3) Normal and Emergency Operating Instructions - Provide a discussion of the normal and emergency operation and control of the system. Address operating norms (for example, temperatures, pressures, and flow rates) expected at each zone or phase of the system. Supplement the discussion with control and wiring diagrams and data. Include shutdown instruction for fires, explosions, spill, or other contingencies.

(4) System Flow Diagrams - Provide a flow diagram indicating system liquid, air or gas flow during normal operations. Integrate all system components into the diagram. A compilation of non-integrated, flow diagrams for the individual system components are not acceptable.

(5) Diagrammatic Plans - Provide floor plans indicating the location of equipment and configuration of the system installation. Include the configuration of associated piping or wiring. Subordinate structural features to utility features.

(6) Field Test Reports - Provide Field Test Reports (SD-06) that apply to equipment associated with the system.

(7) Operator Servicing Requirements - Provide instructions for services to be performed by the operator such as lubrication, adjustments, and inspection.

(8) Valve List - Provide a list of all valves associated with the system. Show valve type, identification number, function, location and normal operating position.

b. Preventive Maintenance- Preventive Maintenance Procedures, and Schedules - Provide Task Card for each individual maintenance task identified on the PM plan and Schedule. Include detailed PM procedures, safety instructions and precautions including lock out/tag out precautions, required skill level, number of personnel needed, frequency, special tools needed, parts needed, and estimated time required to complete the task. Include lubrication schedules indicating types, grades and capacities.

c. Troubleshooting Guides and Diagnostic Techniques - Provide step-by-step procedures for isolating the cause of system malfunctions.

The procedures shall clearly state indications or symptoms of trouble; the sequential instructions, including checks and tests to be performed and conditions to be sought, to determine the cause; and remedial measures to bring the equipment and system to operating condition. Identify special test equipment required to perform the procedures. Start the troubleshooting guide at the system level and proceed to a level where detailed manufacturer's troubleshooting procedures for equipment and components can be referenced. Provide clear references to repair procedures included in Part III, Product Data.

2.1.3 PART III - Construction Submittals

This portion of the OMSI manual provides a record of the as-built products, materials, and equipment used in Part 4, PERFORMANCE TECHNICAL SPECIFICATIONS, and Part 5, PRESCRIPTIVE SPECIFICATIONS, of the Request for Proposal (RFP). This submittal includes a complete copy of the approved construction submittal used in the facility construction. Include, as a minimum, O&M Data, Materials, Equipment, Data Sheets, Test Reports, Warranties, Certificates, and Shop Drawings.

PART 3 EXECUTION

3.1 VALIDATION and PRESENTATION

Provide a validation presentation of the OMSI Prefinal submittal to the users and field verify the OMSI's completeness and accuracy. Perform the validation site visit at the 100% - Prefinal OMSI submittal stage. Contact the Contracting Officer for the exact date.

The Commissioning Authority (CA) shall attend and provide a certifying statement that validation site visit and presentation is complete.

-- End of Section --

SECTION 01 78 30.00 22

DIGITAL DATA DELIVERABLES (GIS)

03/10

PART 1 GENERAL

1.1 OBJECTIVE

The primary objective of this section is to provide detailed specifications for Geographic Information System (GIS), Global Positioning System (GPS), and for CAD Computer-aided design (CAD) deliverables as part of this contracted effort. This will ensure that all data collected and/or updated will be useable in MCB Camp Lejeune's Installation Geospatial Information and Services (IGI&S) repository. Any maps, drawings, figures, sketches, geospatial data, spreadsheets, or text files prepared for this contract shall be provided in both hard copy and digital form. The hard copy deliverables are defined in another paragraph of this section. Please see paragraph "EXAMPLES OF GEOSPATIAL DATA CONTENT AND STRUCTURE BY PROJECT TYPE" for recommended data content and structure based on specific project types.

1.1.1 Point of Contact for MCB Camp Lejeune

The Point of Contact (POC) for assistance in preparation of GIS deliverables is:

MS Debbie Moffitt
Camp Lejeune IG&S Manager
(910) 451-8915/5876

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES:

SD-11 Closeout Submittals

GIS data deliverables; G

1.3 SPECIFIC TASKS

Provide geospatial data and documents for all features added, demolished or modified as a part of this project.

1.3.1 Geospatial Data Content and Structure

1.3.1.1 GIS Data Sets

Provide the content or specific data being collected/updated as deliverables (submittals).

A. New GIS Feature class: When developing/delivering a new feature class, the Contractor shall develop the initial structure consistent with the most current version of the GEOFidelis Data Model. This model is based

on the Spatial Data Standards for Facilities, Infrastructure and Environment (SDSFIE), also known as the National Committee for Information Technology Standards 353. The SDSFIE shall be followed for geospatial database table structure, nomenclature, attributes, domains and symbology. The Contractor shall then consult with the Contracting Officer concerning modifications or additions to the SDSFIE required by the specific business use to which the data will be applied. Failure for non-compliance of the specifications outlined in this document will result in non-acceptance of data deliverables.

Copies of the GEOFidelis Data Model may be obtained from the GEOFidelis web portal via the Contracting Officer.

Copies of the SDSFIE may be obtained from the Solutions and Technology for the Advancement and Refinement of SDSFIE (STARS) Team Internet homepage at http://www.sdsfie.org/ or by contacting:

Marc Beckel
Deputy Program Manager, SDSFIE
Northrop Grumman IT, TASC
Marc.beckel@ngc.com

B. Updating Existing GIS Feature Classes: When delivering updates to existing feature classes, the Contractor shall first obtain a copy of the subject data in a file geodatabase or personal geodatabase from the IGI&S Office via the Contracting Officer. The geodatabase shall be used as a template for all subsequent data collection processes. As MCB Camp Lejeune has modified the SDSFIE structure for many feature classes to accommodate operational needs, the SDSFIE structure may not reflect the actual structure used in the geodatabase. If further modifications to structure are required as a result of this project, the Contractor will consult with the Contracting Officer for direction and final approval. Additionally, all utilities data shall be created within the specifications of spatial connectivity rules which indicate that vertex, edge and endpoints be snapped to features within the utility system. Also, all attribute domain configuration(s) shall consist of the accurate case and spelling for each domain.

-AND / OR (IF CADD IS BEING USED)-

1.3.1.2 CADD Drawings/Data

The Contractor shall develop all CADD data in conformance with the latest version of the following standards and policies:

U. S. National CAD Standards (NCS)

CAD/BIM Technology Center's AEC CADD Standards (https://cadbim.usace.army.mil/default.aspx)

NAVFACINST 4250.1, Electronic Bid Solicitation

1.3.2 Geospatial Data Collection

1.3.2.1 Mapping grade Global Positioning System (GPS) data collection

Mapping grade Global Positioning System (GPS) data collection (sub-foot, sub-meter, and sub-5 meter) shall be provided and shall be completed in accordance with the "Statewide Global Positioning System (GPS) Data

Collection and Documentation Standards, Version 3" (or higher version if available at the time of this project) as prepared by the Statewide Mapping Advisory Committee and adopted by the North Carolina Geographic Coordinating Council in May 2006. Copies of these standards can be found on the Internet at: http://www.cgia.state.nc.us/gicc. Default horizontal accuracy for mapping grade GPS data collection efforts shall meet a sub-meter threshold unless otherwise specified to be survey grade, sub-foot or sub-5 meter. Only base stations included in the North Carolina Geodetic Survey Base Station Network shall be used for mapping grade GPS data collection. Spatial accuracy requirements are as follows:

- Sub foot: 95% of all points are within + 12 inches

-OR-

- Sub meter: 95% of points are within + 1 Meter

-OR-

- Sub 5 meter: 95% of points are within + 5 Meters

-AND / OR-

1.3.2.2 Survey grade GPS data collection

Survey grade GPS data collection shall be performed when specified. As survey processes are highly regulated by federal, state, and/or local technical and licensing requirements, they are in general beyond the scope of this document. However, survey grade GPS data collection shall at a minimum use the Geoid2003 CONUS epoch (or a more current epoch if available at the time of this project) and spatial accuracy requirements for survey grade are 95 % of GPS points are within + 1 centimeter. Every effort shall be made to capture feature locations without using offsets unless obstructions are present. Any offsets used shall be annotated in the "user flag" field.

NOTE: None of the GPS collection information is to be included in the table structure of the delivery, unless it is specifically part of the SDSFIE or established MCB Camp Lejeune feature format.

1.3.2.3 Submittal Details

Submit GIS data deliverables for review and approval by the MCB Camp Lejeune Public Works GIS section.

A. Text, Spreadsheet, and Database Files: The Marine Corps standard computing software is Microsoft Office 2003. Final Reports and other text documents shall be provided in Microsoft Word 2003 format AND Adobe Portable Document Format (PDF). Spreadsheet files shall be provided in Microsoft Excel format. Databases shall be provided in Microsoft Access format, unless specified otherwise, as approved by the Government. Prior to database development, the contractor shall provide the Government with a Technical Approach Document for approval, which describes the contractor's technical approach to designing and developing the database. All text, spreadsheet, and database files shall be delivered on a compact disk read-only memory (CD-ROM) or Digital Versatile Disc read-only memory (DVD-ROM) or other government approved media such as external hard drives.

B. Maps, Drawings, and Sketches (Digital Geospatial Data):

1. Geospatial Data Software Format: Geographic data must be provided in a form that does not require translation, preprocessing, or post processing before being loaded to the MCB Camp Lejeune enterprise geodatabase. The Contractor shall coordinate any deviations from this specification in writing with the Contracting Officer (who will coordinate with the Installation GI&S Manager as needed). Digital geographic maps and the related data sets shall be delivered in the following software format:

a. GIS: File geodatabase (preferred) or a personal geodatabase format (Access database file) using ArcGIS 9.3 (or higher, if a higher version is approved by the government at the time of this project). The geodatabase must be importable to a SQL Server 2005 multi-user geodatabase using ArcSDE 9.3. The delivered data layer(s) shall be provided with x,y domain precision of 1000.

-AND / OR (IF CAD IS BEING INCLUDED)-

b. CADD: All CADD data shall be provided in AutoCAD 2008 (or later version as approved by the Government), and shall be in the same projection and use the same coordinate system, datum, and units as stated below in the paragraph titled Geospatial Data Projection. Drawing files shall be full files, uncompressed, unzipped, and georeferenced.

(NOTE: ArcGIS and ArcSDE are Geographic Information System software produced by the Environmental Systems Research Institute (ESRI) of Redlands, California. AutoCAD is software produced by Autodesk, Inc. These software are used by MCB Camp Lejeune's Geographic Information System.)

C. Geospatial Data Projection: Geographic data (regardless of format) shall be provided in Feet and projected into the NAD 1983 State Plane North Carolina FIPS 3200 Feet coordinate system. The maps and data shall use Lambert Conformal Conic Projection, the GRS 1980 spheroid and the North American Datum 1983. This projection requirement applies to all CADD drawings such as as-designed and as-built project plans, as well as GIS data layer deliverables. Each data set shall have a projection file if appropriate based on format. Map or drawing scales will be determined by the Contracting Officer, if applicable. Mapping accuracy for the agreed scales will conform to the American Society for Photogrammetry and Remote Sensing (ASPRS) "Accuracy Standards for Large-Scale Maps", "Interim Accuracy Standards for Large-Scale Maps", and "Geospatial Positioning Accuracy Standards". Copies of these standards can be obtained on the Internet at http://www.asprs.org , and/or at http://www.fgdc.gov or by contacting:

American Society for Photogrammetry and Remote Sensing
5410 Grosvenor Lane, Suite 210
Bethesda, MD 20814-2160

D. Media for Geospatial Data Deliverables: Geographic data shall be delivered on a separate compact disk read-only memory (CD-ROM) -or-, digital versatile disk read-only memory (DVD-ROM), or other digital media such as external hard drives if approved by the government. This media shall contain only the value-added data sets. Do not include the Contractor's working files or original MCB Camp Lejeune data sets that

may have been used by the Contractor to develop the deliverables. "READ ME" files may be included on the geographic data media if such files provide explanation of the delivered data sets. However, these "READ ME" files should not be delivered in lieu of standard metadata.

E. Geographic Data Documentation (METADATA): For each digital file delivered containing geographic information (regardless of format), the Contractor shall provide documentation consistent with the Federal Geographic Data Committee (FGDC) Content Standards for Digital Geospatial Metadata (CSDGM). Both 'Mandatory' and 'Mandatory-if-Applicable' fields shall be completed for each geographic data set. The documentation shall include, but not be limited to, the following:

1. Type of data layer (point, line, polygon, etc.),
2. Field names of all attribute data and a description of each field name
3. Definition of all codes used in the data fields
4. Ranges of numeric fields and the meaning of these numeric ranges
5. The creation date of the data layer and the name of the person who created it
6. A point of contact shall be provided to answer technical questions.

Metadata generation tools included in the ArcGIS suite of software (or equivalent technology) shall be used in the production of the required metadata in XML format. If neither of these tools is used, the Contractor must insure that the metadata is delivered in a format that can be easily translated to the XML format. Copies of the FGDC metadata standard can be obtained on the Internet at http://www.fgdc.gov or by contacting:

FGDC Secretariat
c/o U.S. Geological Survey
590 National Center
Reston, Virginia 22092
(703) 648-5514

NOTE: The metadata should be formatted from the MCB Camp Lejeune database perspective, not the Contractor project perspective. Therefore such items as Point of Contact should be the MCB Camp Lejeune POC currently associated with the data and NOT the Contractor's Project Manager. The Contractor shall use language and format consistent with existing MCB Camp Lejeune metadata.

F. Geographic Data Review:

1. The digital geographic maps, GPS related data, and text documents shall be included for review in the draft and final contract submittals.

2. For the Draft review of digital geospatial data deliverables, the Contractor may be required to provide a technical consultant to meet on-site at MCB Camp Lejeune with the Contracting Officer, IGI&S Manager, and functional area subject matter experts to visually review the data deliverables on a Windows 2000/XP compatible system unless otherwise approved by the government.

3. The data will be analyzed for discrepancies in subject content, correct format in accordance with these specifications, and compatibility with MCB Camp Lejeune's IGI&S repository.

4. The Contractor shall incorporate review comments to data and text prior to approval of the final submittal.

G. Ownership: All digital files, final hard-copy products, source data acquired for this project, and related materials, including that furnished by the Government, shall become the property of MCB Camp Lejeune and will not be issued, distributed, or published by the Contractor.

1.4 EXAMPLES OF GEOSPATIAL DATA CONTENT AND STRUCTURE BY PROJECT TYPE

1.4.1 Infrastructure

Attribute data requirements for Infrastructure: The following attributes shall be collected for each infrastructure data class: Collect GPS data for all features listed with Sub-Meter accuracy.

1.4.1.1 Structures: CLJN.structure_existing_area

GPS Structure and collect the following attributes:

(a) Subtype ID: Structure, Canopy/Pavilion, Shed, Towers, Carport, etc (see domain table)
(b) Building ID: Facility Number
(c) Structure Status: existing structure, portable, etc.
(d) Number of Levels
(e) Structure Use 2: Populate "Residential" if structure is a residential unit
(f) Material: Brick, Vinyl, etc.
(g) Drawing Number
(h) Drawing Type
(i) Contract N
(j) Date Acquired: Year
(k) Source: Survey Grade GPS, Located in Field, Sub-Meter Grade GPS, Georeferenced Drawing, AutoCAD Drawing

1.4.1.2 Floor Outline: CLJN.building.floor_outline

All new and renovated buildings will be required to have a "clean floor plan" for each floor level that will be delivered in GIS and AutoCAD format. Each level will represent one feature and provide the following: walls, doors, windows, closet, crawlspace, head facility, stairwells, etc.

Create feature and update the following attributes:

(a) Building ID: Facility number
(b) Floor Name
(c) Subtype ID: Attic, Main Floor, Second Floor, Basement (Domain)
(d) Drawing Number
(e) Drawing Type
(f) Contract Number
(g) Data Source: Sub-Meter GPS, Survey Grade GPS, Georeferenced Drawing, AutoCAD Drawing

NOTE: Renovated floor plans will include total floor plan for each level. Each floor level shall be presented as one feature.

1.4.1.3 Slabs: CLJN.slab_area

GPS and collect the following attributes:

(a) Structure ID: (Facility Number, if applicable)
(b) Feature Description: include type of utility when applicable i.e., Generator, Pad Transformer, etc.
(c) Structure Material
(d) Structure Condition
(e) Built Date
(f) Drawing Number
(g) Drawing Type
(h) Contract Number
(i) Data Source: Sub-Meter GPS, Survey Grade GPS,
(j) Georeferenced Drawing, AutoCAD Drawing

1.4.2 Transportation

Attribute data requirements for Transportation: The following attributes shall be collected for each infrastructure data class: Collect GPS data for all features listed with Sub-Meter accuracy.

1.4.2.1 Road Centerline: CLJN.road_centerline

GPS and collect the following attributes:

(a) Category: Main, Secondary, Tertiary, etc.
(b) Number of Lanes
(c) Road Name
(d) Paved: PAVED / UNPAVED
(e) Date Acquired: Year
(f) Surface Type: ASPHALT, GRAVEL, DIRT, ETC.
(g) Paved or Unpaved
(h) Drawing Number
(i) Drawing Type
(j) Contract Number
(k) Data Source: Sub-Meter GPS, Survey Grade GPS, Georeferenced Drawing, etc.
(l) Use: Abandoned, Active, Unknown, etc.
(m) Ramp: Yes, No

1.4.2.2 Road Area: CLJN.road_area

GPS and collect the following attributes:

(a) Category: Main, Secondary, Tertiary, etc.
(b) Road Segment
(c) Paved
(d) Center Marks: yes / no
(e) Divided: yes / no
(f) Number of Lanes
(g) Installation Date
(h) Surface Type: Bitumen, Cement, etc.
(i) Drawing Number
(j) Drawing Type
(k) Contract Number
(l) Data Source: Sub-Meter GPS, Survey Grade GPS, Georeferenced Drawing, AutoCAD Drawing
(m) Road_Name

(n) Ramp: Yes, No

1.4.2.3 Curb line: CLJN.curb_line

GPS and collect the following attributes:

(a) Date Built
(b) Curb Material
(c) Description
(d) Drawing Number
(e) Drawing Type
(f) Contract Number
(g) Data Source: Sub-Meter GPS, Survey Grade GPS, Georeferenced Drawing, AutoCAD Drawing

1.4.2.4 Driveways: CLJN.vehicle_driveway_area

GPS and collect the following attributes:

(a) Driveway ID: Building that is associated with this feature
(b) Paved or Unpaved: Yes / No,
(c) Surface Material
(d) Installation Date
(e) Lighting: yes / no
(f) Drawing Number
(g) Drawing Type
(h) Contract Number
(i) Data Source: Sub-Meter GPS, Survey Grade GPS, Georeferenced Drawing, AutoCAD Drawing

1.4.2.5 Parking Lots: CLJN.vehicle_parking_area

GPS and collect the following attributes:

(a) Parking ID: Building that is associated with this feature
(b) Paved or Unpaved Yes / No
(c) Total Spaces
(d) Lighting: yes / no
(e) Installation Date
(f) Drawing Number
(g) Drawing Type
(h) Contract Number
(i) Data Source: Sub-Meter GPS, Survey Grade GPS, Georeferenced Drawing, AutoCAD Drawing
(j) Feature_Description: Description of parking area
(k) Surface_Type: Materials used to construct parking area.
(l) Vehicle_Day: Average # of vehicles per day
(m) Park_use: primary use of parking area: Hospital, Hunting, Office, Recreation, etc.
(n) Feature Name: Name of parking area
(o) Striping: Parking areas are striped or not.
(p) Vehicle_Type: Type of vehicle in parking area: GOV, POV, Other, unknown, etc.

1.4.2.6 Bridge: CLJN.road_bridge_area

GPS and collect the following attributes:

(a) Bridge ID: Facility Number

(b) Number of Lanes
(c) Bridge Material Type
(d) Bridge Type
(e) Capacity:
(f) Installation Date
(g) Drawing Number
(h) Drawing Type
(i) Contract Number
(j) Data Source: Sub-Meter GPS, Survey Grade GPS, Georeferenced Drawing, AutoCAD Drawing
(k) Feature Name: common name for the bridge
(l) Bridge_Status: Operational status of bridge

1.4.2.7 Pedestrian Sidewalks: CLJN.pedestrian_sidewalk_area

GPS and collect the following attributes:

(a) Material
(b) Use: Residential, General Pedestrian, etc
(c) Installation Date
(d) Status
(e) Drawing Number
(f) Drawing Type
(g) Contract Number
(h) Data Source: Sub-Meter GPS, Survey Grade GPS, Georeferenced Drawing, AutoCAD Drawing

1.4.3 Improvement

Attribute data requirements for Improvement: The following attributes shall be collected for each infrastructure data class: Collect GPS data for all features listed with Sub-Meter accuracy.

1.4.3.1 Fence: CLJN.fence_line

GPS and collect the following attributes:

(a) Subtype ID: FENCE, GATE, WALL
(b) Material: CHAIN LINK, WOOD, etc
(c) Containment Type: AST, Parking lot, Pumping Station, Pond, Well, etc
(d) Feature Height
(e) Units of Measure
(f) Drawing Number
(g) Drawing Type
(h) Contract Number
(i) Data Source: Sub-Meter GPS, Survey Grade GPS, Georeferenced Drawing, AutoCAD Drawing
(j) Length: Length of fence, gate, wall

1.4.3.2 Gates: CLJN.gate_line

GPS and collect the following attributes:

(a) Subtype ID: FENCE, GATE, WALL
(b) Material: CHAIN LINK, WOOD, etc
(c) Containment Type: AST, Parking lot, Pumping Station, Pond, Well, etc
(d) Feature Height

(e) Units of Measure
(f) Drawing Number
(g) Drawing Type
(h) Contract Number
(i) Data Source: Sub-Meter GPS, Survey Grade GPS, Georeferenced Drawing, AutoCAD Drawing
(j) Length: Length of fence, gate, wall

1.4.3.3 Walls: CLJN.wall_line

GPS and collect the following attributes:

(a) Subtype ID: FENCE, GATE, WALL
(b) Material: CHAIN LINK, WOOD, etc
(c) Containment Type: AST, Parking lot, Pumping Station, Pond, Well, etc
(d) Feature Height
(e) Units of Measure
(f) Drawing Number
(g) Drawing Type
(h) Contract Number
(i) Data Source: Sub-Meter GPS, Survey Grade GPS, Georeferenced Drawing, AutoCAD Drawing
(j) Length: Length of fence, gate, wall

1.4.3.4 Recreation Trails: CLJN.recreation_trail_centerline

GPS and collect the following attributes:

(a) Subtype: MULTI-PURPOSE, RIDING, etc
(b) Trail Description: PAVED, UNPAVED, DIRT, etc
(c) Paved: YES / NO
(d) Date Acquired: Year
(e) Drawing Number
(f) Drawing Type
(g) Contract Number
(h) Data Source: Sub-Meter GPS, Survey Grade GPS, Georeferenced Drawing, AutoCAD Drawing
(i) trail_id: trail identifier
(j) Trail_Name: Name of rec. trail

1.4.3.5 Playground: CLJN.playground_area

GPS and collect the following attributes:

(a) Playground ID: Facility Number
(b) Feature Description:
(c) Drawing Number
(d) Drawing Type
(e) Contract Number
(f) Data Source: Sub-Meter GPS, Survey Grade GPS, Georeferenced Drawing, AutoCAD Drawing

1.4.3.6 Swimming Pool: CLJN.swimming_pool_area

GPS and collect the following attributes:

(a) Swimming Pool ID: Facility Number
(b) Feature Description: recreation / training

(c) Drawing Number
(d) Drawing Type
(e) Contract Number
(f) Data Source: Sub-Meter GPS, Survey Grade GPS, Georeferenced Drawing, AutoCAD Drawing

1.4.3.7 Athletic Court: CLJN.athletic_court_area

GPS and collect the following attributes:

(a) Court ID: Facility Number
(b) Court Type: Tennis Court, Basketball Court, Baseball Field, Football Field, etc.
(c) Court Name
(d) Date Acquired
(e) Drawing Type
(f) Drawing Number
(g) Contract Number
(h) Data Source: Sub-Meter GPS, Survey Grade GPS, Georeferenced Drawing, AutoCAD Drawing
(i) Court Desc: Misc. info about court

1.4.3.8 Athletic Field: CLJN.athletic_field_area

GPS Structures and collect the following attributes:

(a) Field ID: Facility Number
(b) Field Description: SOFTBALL FIELD, OBSTACLE TRAINING, PT FIELD, etc
(c) Date Acquired: Year
(d) Field Type
(e) Drawing Type
(f) Contract Number
(g) Drawing Number
(h) Data Source: Sub-Meter GPS, Survey Grade GPS, Georeferenced Drawing, AutoCAD Drawing
(i) Field Name

1.4.4 Environmental Storage Tanks

Attribute data requirements for Environmental Storage Tanks: The following attributes shall be collected for each infrastructure data class: Collect GPS data for all features listed with Sub-Meter accuracy.

1.4.4.1 Underground Storage Tanks: CLJN.underground_storage_tank_point

GPS and collect the following attributes:

(a) ENVUST-ID for Under Ground Storage Tank
(b) Hazsite_ID
(c) EH_Tank: Fuel Type
(d) Facility Number
(e) X Coordinates
(f) Y Coordinates
(g) Installation Date: YEAR
(h) Drawing Number
(i) Drawing Type
(j) Contract Number
(k) Data Source: Sub-Meter GPS, Survey Grade GPS, Georeferenced etc

(l) Product_D: Chemicals, Coal, Gas, Oil, Unknown, other, etc.
(m) Narrative
(n) Serial Number
(o) Tank_Sys_D: Subsystem the tank belongs: Fuel, Gas, water, wastewater, etc.
(p) Status: Abandoned, closed, inuse, etc.
(q) regulated: y/n
(r) Volume
(s) Volume_U_D: Unit of measure for Volume

1.4.4.2 Aboveground Storage Tanks: CLJN.aboveground_storage_tank_site

GPS and collect the following attributes:

(a) ENVAST_ID for Above Ground Storage Tank
(b) Hazsite_ID
(c) EH_Tank: Fuel Type
(d) Facility Number
(e) X Coordinates
(f) Y Coordinates
(g) Installation Date: YEAR
(h) Drawing Number
(i) Drawing Type
(j) Contract Number
(k) Data Source: Sub-Meter GPS, Survey Grade GPS, Georeferenced etc
(l) Product_D: Chemicals, Coal, Gas, Oil, Unknown, other, etc.
(m) Narrative
(n) Serial Number
(o) Tank_Sys_D: Subsystem the tank belongs: Fuel, Gas, water, wastewater, etc.
(p) Status: Abandoned, closed, in use, etc.
(q) Regulated: y/n
(r) Volume
(s) Volume_U_D: Unit of measure for Volume

1.4.5 Other Features

Other Infrastructure Features:

All newly constructed features require GIS deliverables. If a particular utility is being installed and has been omitted from this specification, the feature shall be deliverable under these guidelines. At a minimum the following will be required;

(a) Subtype Id
(b) Facility ID
(c) Installation Date
(d) Type/Description
(e) Material
(f) Drawing Number
(g) Contract Number
(h) Data Source: Survey Grade GPS, Sub-Meter GPS, Georeferenced Drawing, AutoCAD Drawing

1.4.6 Utilities

Locate and Collect GPS data for each feature listed with survey grade accuracy.

Electrical Distribution - Please Note: MCB Camp Lejeune's Complete Circuit ID list is available upon request.

1.4.6.1 Demolished Electrical Lines: CLJN.demolished_cable_line

Existing attribute information will be copied into the demolished feature class: Please add the following attribute data once updated.

(a) Date
(b) Drawing Number
(c) Drawing Type
(d) Contract Number
(e) Data Source: Existing GIS Data, Survey Grade GPS, Sub-Meter GPS, Georeferenced Drawing, AutoCAD Drawing

1.4.6.2 Electrical Lines: CLJN.electrical_cable_line

Locate all Electrical Line data and collect the following attributes:

(a) Subtype Identifier: Primary OH, Primary UG, Secondary OH, Secondary UG, Service OH, Service UG
(b) Disposition: Permanent, Buried, Abandoned etc
(c) Subtype: Overhead/Underground
(d) Date Acquired: Year
(e) Conduit Size
(f) Number of Phases
(g) Insulation Material
(h) Voltage
(i) Size of Units
(j) Substation ID
(k) Circuit ID: RG1, RG2, AS1, ASL, FC1, FC2, MAL, etc
(l) Contract Number
(m) Drawing Number
(n) Secondary Voltage: i.e., 12470\7200, 480\277, 120\240, etc
(o) Data Source: Survey Grade GPS, Located in Field, Sub-Meter GPS, Georeferenced Drawing, AutoCAD, Drawing

1.4.6.3 Electrical Meter: CLJN.electrical_meter_point

Locate, GPS and collect the following attributes:

(a) Meter ID
(b) Voltage
(c) KW Rate
(d) Number of Phases
(e) Model Number
(f) Date Acquired
(g) Facility ID
(h) Substation ID
(i) Circuit ID: RG1, RG2, AS1, ASL, FC1, FC2, MAL, etc
(j) X Coordinates
(k) Y Coordinates
(l) Contract Number
(m) Drawing Number
(n) Data Source: Survey Grade GPS, Located in Field, Sub-Meter GPS, Georeferenced Drawing, AutoCAD Drawing

1.4.6.4 Electrical Transformer: CLJN.elect_transformr_bank_point

Locate, GPS and collect the following attributes:

(a) Subtype: Pole Mount, Pad Mount
(b) Transformer Id
(c) Date Installed
(d) Primary Voltage
(e) Secondary Voltage
(f) Number of Transformers
(g) Total KVA
(h) Substation ID
(i) Circuit ID: RG1, RG2, AS1, ASL, FC1, FC2, MAL, etc
(j) KVA Information
(k) X Coordinates
(l) Y Coordinates
(m) Contract Number
(n) Drawing Number
(o) Data Source: Survey Grade GPS, Located in Field, Sub-Meter GPS, Georeferenced Drawing, AutoCAD Drawing

1.4.6.5 Electrical Poles: CLJN.exterior_lighting_point

Locate, GPS and collect the following attributes:

(a) Pole No
(b) Date Acquired: Year
(c) Condition
(d) Type: pole, riser, down guy, etc
(e) Material
(f) Pole Height
(g) Units of Measure
(h) Circuit ID (previously Feeder ID): RG1, RG2, AS1, ASL, FC1, FC2, MAL, etc
(i) X Coordinates
(j) Y Coordinates
(k) Contract Number
(l) Drawing Number
(m) Data Source: Survey Grade GPS, Located in Field, Sub-Meter GPS, Georeferenced Drawing, AutoCAD Drawing

1.4.6.6 Exterior Lighting: CLJN.utility_pole_tower_point

Locate, GPS and collect the following attributes:

(a) Light Type
(b) X Coordinates
(c) Y Coordinates
(d) Sensor: YES/ NO
(e) Watts
(f) Voltage
(g) Circuit ID: RG1, RG2, AS1, ASL, FC1, FC2, MAL, etc
(h) Contract Number
(i) Drawing Type
(j) Drawing Number
(k) Date Acquired: Year
(l) Data Source: Survey Grade GPS, Located in Field, Sub-Meter GPS, Georeferenced Drawing, AutoCAD Drawing

1.4.6.7 Electrical Switch: CLJN.electrical_switch_point

Locate, GPS and collect the following attributes:

(a) Subtype ID: Circuit Breaker, Fuse Cutout, GOABS, Reclosures; Switch, Vacuum, Disconnect, Other
(b) Switch ID: if applicable
(c) Disposition
(d) Installation Type: Pad Mounted, Pole Mounted, Cubicle, etc
(e) Switch Status: Open, Closed
(f) Voltage
(g) Circuit ID: RG1, RG2, AS1, ASL, FC1, FC2, MAL,etc
(h) X Coordinates
(i) Y Coordinates
(j) Contract Number
(k) Drawing Number
(l) Data Source: Survey Grade GPS, Located in Field, Sub-Meter GPS, Georeferenced Drawing, AutoCAD Drawing

1.4.6.8 Electrical Regulator: CLJN.electrical_regulator_point

Locate, GPS and collect the following attributes:

(a) Electrical Regulator ID: Facility Number
(b) Disposition
(c) Regulator Type
(d) Regulator Use
(e) Primary Volts
(f) Secondary Volts
(g) Number of Taps
(h) KV Rate
(i) Fuse Type
(j) Manufacture
(k) Model Number
(l) Circuit ID: RG1, RG2, AS1, ASL, FC1, FC2, MAL, etc
(m) X Coordinates
(n) Y Coordinates
(o) Contract Number
(p) Drawing Number
(q) Data Source: Survey Grade GPS, Located in Field, Sub-Meter GPS, Georeferenced Drawing, AutoCAD Drawing

1.4.6.9 Electrical Manholes: CLJN.electrical_junction_point

Locate, GPS and collect the following attributes:

(a) Subtype ID: Manhole, Junction Box, etc
(b) Manhole Number
(c) Type: handhole, junction_box, manhole, unknown, other, etc.
(d) Number of Cables
(e) Rim Elevation
(f) Units of Elevation
(g) Diameter
(h) Diameter Units
(i) X Coordinates
(j) Y Coordinates
(k) Sub Station ID
(l) Contract Number
(m) Drawing Number

(n) Data Source: Survey Grade GPS, Located in Field, Sub-Meter GPS, Georeferenced Drawing, AutoCAD Drawing

1.4.6.10 Electrical Generators: CLJN.electrical_generator_point

Locate, GPS and collect the following attributes:

(a) Generator ID
(b) Disposition
(c) Type
(d) KVA
(e) KW Rate
(f) Voltage
(g) Fuel Type
(h) Manufacture
(i) Model
(j) Serial Number
(k) Circuit ID: RG1, RG2, AS1, ASL, FC1, FC2, MAL, etc
(l) X Coordinates
(m) Y Coordinates
(n) Facility ID
(o) Contract Number
(p) Drawing Number
(q) Data Source : Survey Grade GPS, Sub-Meter GPS, Georeferenced Drawing, AutoCAD Drawing

1.4.7 STEAM DISTRIBUTION

Collect GPS data - survey grade

1.4.7.1 Boiler: CLJN.heat_cool_boiler_site - If Required

Locate, GPS and collect the following attributes:

(a) Date Acquired: Year
(b) Disposition
(c) Type
(d) Capacity Heat
(e) Capacity Units
(f) Building ID: Facility Number where Boiler Resides
(g) X Coordinates
(h) Y Coordinates
(i) Contract Number
(j) Drawing Number
(k) Data Source: Survey Grade GPS, Sub-Meter GPS, Georeferenced Drawing, AutoCAD Drawing

1.4.7.2 Fitting: CLJN.heat_cool_fitting_point

Georeference fitting data and collect the following attributes:

(a) Subtype ID: Anchor, Cap, Elbow, Expansion Joint, Tank
(b) Date Acquired: Year
(c) Fitting Type
(d) Material
(e) Size
(f) Units
(g) Line Diameter
(h) Diameter in Units

(i) Installation Date
(j) X Coordinates
(k) Y Coordinates
(l) Contract Number
(m) Drawing Number
(n) Data Source: Survey Grade GPS, Located in Field, Sub-Meter GPS, Georeferenced Drawing, AutoCAD Drawing

1.4.7.3 Valves: CLJN.heat_cool_valve_point

Locate, GPS and collect the following attributes:

(a) Data Acquired
(b) Valve Type
(c) Valve Group/Class
(d) Size
(e) Size Units
(f) Elevation
(g) Elevation Units
(h) Project ID
(i) X Coordinates
(j) Y Coordinates
(k) Contract Number
(l) Drawing Number
(m) Data Source: Survey Grade GPS, Located in Field, Sub-Meter GPS, Georeferenced Drawing, AutoCAD Drawing

1.4.7.4 Manholes: CLJN.heat_cool_junction_point

Locate, GPS and collect the following attributes:

(a) Sub Type ID: Steam Pit, Valve Pit, Cooling Pit
(b) Number of Valves
(c) Number of Pipes
(d) Width
(e) Length
(f) Diameter
(g) Units for Measurements
(h) Rim Elevations
(i) Ground Elevation
(j) Contract Number
(k) Drawing Number
(l) X Coordinates
(m) Y Coordinates
(n) Data Source : Survey Grade GPS, Sub-Meter GPS, Georeferenced Drawing, AutoCAD Drawing

1.4.7.5 Steam Line: CLJN.heat_cool_line

Locate, GPS and collect the following attributes:

(a) Subtype ID: Condensate, Steam
(b) Date Acquired: Year
(c) Disposition
(d) Use Underground, Overhead, Abandoned
(e) Material
(f) Size
(g) Length
(h) Size Units

(i) Ground Elevation
(j) Invert Elevation
(k) Units for Elevation
(l) Taped: Yes/No
(m) Building ID - If service line indicate Building
(n) Insulation Material
(o) Size of Insulation
(p) Size Units
(q) Contract Number
(r) Drawing Number
(s) Data Source: Survey Grade GPS, Located in Field, Sub-Meter GPS, Georeferenced Drawing, AutoCAD Drawing

1.4.7.6 Demolished Steam Line: CLJN.demolished_heat_cool_line

Existing attribute information will be copied into the demolished feature class: Please add the following attribute data once updated.

(a) Date
(b) Drawing Number
(c) Drawing Type
(d) Contract Number
(e) Data Source: Existing GIS Data, Survey Grade GPS, Sub-Meter GPS, Georeferenced Drawing, AutoCAD Drawing

1.4.8 STORM SEWER

Collect GPS data - survey grade.

1.4.8.1 Storm Sewer Lines: CLJN.storm_sewer_line

Locate, GPS and collect the following attributes:

(a) Date Acquired: Year
(b) Use
(c) Type
(d) Material
(e) Size
(f) Diameters Units
(g) Elevation
(h) Elevation Units
(i) Contract Number
(j) Drawing Type
(k) Drawing Number
(l) Data Source: Survey Grade GPS, Located in Field, Sub-Meter GPS, Georeferenced Drawing, AutoCAD Drawing

1.4.8.2 Storm Sewer Drainage Line: CLJN.storm_sewer_open drainage_line

Locate, GPS and collect the following attributes:

(a) Date Acquired: Year
(b) Type - subtype Grass Swales, Armored Channels, Dirt, other
(c) Disposition
(d) Contract Number
(e) Drawing Type
(f) Drawing Number
(g) Date Source: Survey Grade GPS, Located in Field, Sub-Meter GPS, Georeferenced Drawing, AutoCAD Drawing

1.4.8.3 Manhole: CLJN.storm_sewer_junction_point

Locate, GPS and collect the following attributes:

(a) Subtype
(b) Number of Pipes in
(c) Number of Pipes out
(d) X Coordinate
(e) Y Coordinates
(f) Contract Number
(g) Drawing Type
(h) Drawing Number
(i) Date Source: Survey Grade GPS, Located in Field, Sub-Meter GPS, Georeferenced Drawing, AutoCAD Drawing

1.4.8.4 Inlet: CLJN.storm_sewer_inlet_point

Locate, GPS and collect the following attributes: Contract shall verify SWPPP GPS inlet and add to this feature.

(a) Subtype - Domain subtype to be "type" such as Catch Basin, Yard, Curb & Gutter
(b) Date Acquired: Year
(c) X Coordinates
(d) Y Coordinates
(e) Contract Number
(f) Drawing Type
(g) Drawing Number
(h) Date Source: Survey Grade GPS, Located in Field, Sub-Meter GPS, Georeferenced Drawing, AutoCAD Drawing

1.4.8.5 Outfall: CLJN.storm_outfall_point

Locate, GPS and collect the following attributes:

(a) Subtype Domain - Industrial or Non-Industrial
(b) Date Acquired: Year
(c) Basin ID - contractor shall utilized existing data and coordinate Basin_ID with data manager.
(d) User_Flag - Data in current data has discharge location in the Narrative field, this data will be use to populate the User_ID field.
(e) X Coordinates
(f) Y Coordinates
(g) Contract Number
(h) Drawing Type
(i) Drawing Number
(j) Date Source: Survey Grade GPS, Located in Field, Sub-Meter GPS, Georeferenced Drawing, AutoCAD Drawing

1.4.8.6 Ponds, Basins, & Treatment Measures: CLJN.storm_sewer_reservoir_areas

Locate, GPS and collect the following attributes:

(a) Date Acquired: YEAR
(b) Project ID:
(c) Permit ID: SW8 XXXXXX
(d) Size:

(e) Facility ID:
(f) Installation ID:
(g) Drawing Type:
(h) Drawing Number:
(i) Oufall Location:
(j) Date Source: Survey Grade GPS, Located in
(k) Field, Sub-Meter GPS, Georeferenced Drawing, AutoCAD Drawing

1.4.9 Wastewater Collection

Collect GPS data - survey grade.

1.4.9.1 Wastewater Lines: CLJN.wastewater_line

Locate, GPS and collect the following attributes:

(a) Pipe ID: by Manhole number
(b) Date Acquired: Year
(c) Use: main line, force main, building/facility service, abandoned/inactive pipe, etc
(d) Material
(e) Size of Diameter
(f) Units
(g) Invert Elevation 1
(h) Invert Elevation 2
(i) Elevation Units
(j) Slope
(k) Slope Units: Percent
(l) Building ID: If building/facility service line indicate Building number that the line services
(m) Contract Number
(n) Drawing Number
(o) Data Source: Survey Grade GPS, Located in Field,
(p) Sub-meter GPS, Georeferenced Drawing, AutoCAD Drawing
(q) Subtype: Abandoned, Main, overflow, Unknown, other, etc.

1.4.9.2 Demolished Lines: CLJN.demolished_wastewater_line

Existing attribute information will be copied into the demolished feature class: Please add the following attribute data once updated.

(a) Date
(b) Drawing Number
(c) Drawing Type
(d) Contract Number
(e) Data Source: Existing GIS Data, Survey Grade GPS, Sub-Meter GPS, Georeferenced Drawing, AutoCAD Drawing

1.4.9.3 Fitting: CLJN.wastewater_fitting_point

Georeference Fitting data and collect the following attributes:

(a) Subtype ID: BEND, CAP, CLEANOUT, REDUCER, TEE, WYE, etc
(b) Date Acquired: Year
(c) Type
(d) Material
(e) Size of Diameter
(f) Units
(g) User Flag: Named Area

(h) Contract Number
(i) Drawing Number
(j) X Coordinates
(k) Y Coordinates
(l) Data Source: Survey Grade GPS, Located in Field, Sub-Meter GPS, Georeferenced Drawing, AutoCAD Drawing

1.4.9.4 Valves: CLJN.wastewater_valve_point

Locate, GPS and collect the following attributes:

(a) Valves ID: Manhole Number associate with valve
(b) Date Acquired: Year
(c) Valve Style/Group: Gate, Check etc
(d) Valve Use
(e) Size in Diameter
(f) Units of Diameter
(g) Valve Elevation
(h) Units of Elevation
(i) X Coordinates
(j) Y Coordinates
(k) Manhole ID
(l) Contract Number
(m) Drawing Number
(n) Data Source: Survey Grade GPS, Located in Field, Sub-Meter GPS, Georeferenced Drawing, AutoCAD Drawing

1.4.9.5 Manholes: CLJN.wastewater_junction_point

Locate, GPS and collect the following attributes:

(a) Subtype ID: Manhole
(b) Manhole ID: Each section of the base has a unique numbering system for manholes; please see Public Work, GIS office for details.
(c) Use: Distribution Box, Junction Box, Manhole, Valve Box,
(d) Type
(e) Material
(f) Number of Pipes in manhole
(g) Rim Elevation
(h) Invert Elevation
(i) Elevations Units
(j) Manhole Diameter
(k) Diameter Units
(l) X Coordinates
(m) Y Coordinates
(n) Date Acquired: Year
(o) Contract Number
(p) Drawing Number
(q) Data Source: Survey Grade GPS, Located in Field, Sub-Meter GPS, Georeferenced Drawing, AutoCAD Drawing

1.4.9.6 Vent: CLJN.wastewater_vent_point

Locate, GPS and collect the following attributes:

(a) Date Acquired: Year
(b) Valve Style/Type: Pressure Relief, Regulating, etc
(c) Use: Control Valve, Flush Valve, etc
(d) Size in Diameters

(e) Units in Diameters
(f) X Coordinates
(g) Y Coordinates
(h) Subtype ID: AIR GAP, AIR CONTROL, AIR RELEASE, Etc
(i) Containment Type
(j) Contract Number
(k) Drawing Number
(l) Data Source: Survey Grade GPS, Located in Field, Sub-Meter GPS, Georeferenced Drawing, AutoCAD Drawing

1.4.9.7 Pump Stations: CLJN.wastewater_pump_point

Locate, GPS and collect the following attributes:

(a) Pump Station ID: Facility Number
(b) Date Acquired: Year
(c) Use: Air, Chemicals, Sanitation Sewage, etc
(d) Type: Submersible Turbine, Vertical Lift Centrifugal, etc
(e) Cooling Method
(f) Rated Outflow Volume
(g) Flow Unit Measure Code
(h) X Coordinates
(i) Y Coordinates
(j) Number of Pumps
(k) Contract Number
(l) Drawing Number
(m) Data Source: Survey Grade GPS, Located in Field, Sub-Meter GPS, Georeferenced Drawing, AutoCAD Drawing

1.4.9.8 Septic Tank: CLJN.wastewater_septic_tank_point

Locate, GPS and collect the following attributes:

(a) Date Acquired: Year
(b) Disposition
(c) Tank capacity
(d) Contract Number
(e) Drawing Number
(f) Data Source: Survey Grade GPS, Located in Field, Sub-Meter GPS, Georeferenced Drawing, autoCAD Drawing

1.4.10 Oil Water Separators

Attribute data requirements for Oil Water Separators: The following attributes shall be collected for each infrastructure data class: Collect GPS data for all features listed with Sub-Meter accuracy.

1.4.10.1 Oil Water Separators: CLJN.wstewat_oil_wat_separatr_point

Locate, GPS and collect the following attributes:

(a) Oil Water Separator ID: Facility Number
(b) Date Acquired: Year
(c) Type
(d) Separator Process
(e) Separator Volume
(f) Volume Units of Measure
(g) Grit Chamber: Yes/No
(h) Flow Capacity

(i) Flow Units
(j) X Coordinates
(k) Y Coordinates
(l) Contract Number
(m) Drawing Number
(n) Data Source: Survey Grade GPS, Located in Field, Sub-Meter GPS, Georeferenced Drawing, AutoCAD Drawing

1.4.10.2 Grease Trap: CLJN.wastewater_grease_trap_point

Locate, GPS and collect the following attributes:

(a) Trap Identification: Nearest Facility use Number
(b) Type of Trap
(c) Material
(d) Capacity
(e) Capacity Units
(f) Manhole: Yes/No
(g) Total Number of Laterals
(h) Flow Rate
(i) Flow Units
(j) Building ID: Facility Number on associated Building
(k) X Coordinates
(l) Y Coordinates
(m) Contract Number
(n) Drawing Number
(o) Data Source: Survey Grade GPS, Located in Field, Sub-Meter GPS, Georeferenced Drawing AutoCAD Drawing

1.4.11 Water Distribution

Collect GPS data - survey grade

1.4.11.1 Water Lines: CLJN.water_line

Locate, GPS and collect the following attributes:

(a) Date Acquired: Year
(b) Use of Line: abandoned/inactive pipe, fire protection, main line, raw water line, building/facility service, sprinkler head
(c) Disposition: Permanent, AIP, etc
(d) Material
(e) Size
(f) Size Units
(g) Pipe Length
(h) Unit for Length Dimension:
(i) Taped: Yes/No
(j) Source: Treatment Plant Facility Number or Water Tank Facility Number
(k) All Invert Elevation information
(l) Units of Measures
(m) Contract Number
(n) Drawing Type
(o) Drawing Number
(p) Data Source: Survey Grade GPS, Located in Field, Sub-Meter GPS, Georeferenced Drawing, AutoCAD Drawing
(q) Subtype: abandoned, fire, main, sprinkler, unknown, other

1.4.11.2 Demolished Line: CLJN.demolished_water_line

Existing attribute information will be copied into the demolished feature class: Please add the following attribute data once updated.

(a) Date
(b) Drawing Number
(c) Drawing Type
(d) Contract Number
(e) Data Source: Existing GIS Data, Survey Grade GPS, Sub-Meter GPS, Georeferenced Drawing, AutoCAD Drawing

1.4.11.3 Water Meter: CLJN.water_meter_point

Locate, GPS and collect the following attributes:

(a) Meter ID
(b) Date Acquired: Year
(c) Type
(d) Installation Type: Installed on a Service Line, (YES/NO)
(e) Building ID: Facility Number - If attached to Building
(f) X Coordinates
(g) Y Coordinates
(h) Contract Number
(i) Drawing Type
(j) Drawing Number
(k) Data Source: Survey Grade GPS, Located in Field, Sub-Meter GPS, Georeferenced Drawing, AutoCAD Drawing

1.4.11.4 Water Tank: CLJN.water_tank_point

Locate, GPS and collect the following attributes:

(a) Tank ID: Facility Number
(b) Date Acquired: Year
(c) Disposition: permanent, abandoned in place
(d) Tank Use: potable, raw water,
(e) Tank Status: Elevated, Ground
(f) Tank Width
(g) Tank Length
(h) Tank Diameter
(i) Ground Elevation
(j) Units of Measure
(k) Tank Volume
(l) Unit of measure in Gallons
(m) Top Elevation
(n) Overflow Elevation
(o) Pressure High
(p) Pressure Low
(q) Source: Water Plant Facility Number
(r) X Coordinates
(s) Y Coordinates
(t) Contract Number
(u) Drawing Type
(v) Drawing Number
(w) Data Source: Survey Grade GPS, Located in Field, Sub-Meter GPS, Georeferenced Drawing, AutoCAD Drawing

1.4.11.5 Water Valve: CLJN.water_valve_point

Locate, GPS and collect the following attributes:

(a) Date Acquired: Year
(b) Disposition: AIP, In Use, etc
(c) Use: Valve
(d) Valve Status: Gate, Air Release, Hydrant, ball
(e) Size
(f) Size Units
(g) Valve Elevation
(h) Ground Elevation
(i) Size Unit
(j) Manhole ID
(k) X Coordinates
(l) Y Coordinates
(m) Contract Number
(n) Drawing Type
(o) Drawing Number
(p) Data Source: Survey Grade GPS, Located in Field, Sub-Meter GPS, Georeferenced, etc
(q) subtype: backflow, check, gate, tap, unknown, etc

1.4.11.6 Water Fitting: CLJN.water_fitting_point

Georeference and collect the following attributes:

(a) Date Acquired: Year
(b) Disposition
(c) Type: Tee, Cap, Bend etc)
(d) Material
(e) Size
(f) Size Units
(g) Contract Number
(h) Drawing Type
(i) Drawing Number
(j) Data Source: Survey Grade GPS, Located in Field, Sub-Meter GPS, Georeferenced Drawing, AutoCAD Drawing

1.4.11.7 Water Well: CLJN.potable_water_well_point

Locate, GPS and collect the following attributes:

(a) Well ID: Facility Number
(b) Use: potable
(c) Well Status
(d) Station ID: Building Number
(e) Date Acquired: Year
(f) Disposition
(g) X Coordinates
(h) Y Coordinates
(i) Tank ID: Water Tank Facility Number
(j) Contract Number
(k) Drawing Type
(l) Drawing Number
(m) Data Source: Survey Grade GPS, Located in Field, Sub-Meter GPS, Georeferenced Drawing, AutoCAD Drawing

1.4.11.8 Water Manhole: CLJN.water_junction_point

Locate, GPS and collect the following attributes:

(a) Subtype
(b) Use
(c) Type
(d) Material
(e) Number Valves
(f) Number Pipes
(g) Installation Date
(h) Size Diameter
(i) Unit Diameter
(j) X Coordinates
(k) Y Coordinates
(l) Contract Number
(m) Drawing Type
(n) Drawing Number
(o) Data Source: Survey Grade GPS, Located in Field, Sub-Meter GPS, Georeferenced Drawing, AutoCAD Drawing

1.4.11.9 Fire Hydrant: CLJN.water_fire_connection_point

Locate, GPS and collect the following attributes:

(a) Hydrant ID: TBD by Fire Department
(b) Date Acquired: Year
(c) Disposition
(d) Valve Connector Type
(e) Valve Size:
(f) Inlet Diameter
(g) Units of measure
(h) Water Source: Tank, Plant etc
(i) X Coordinates
(j) Y Coordinates
(k) Contract Number
(l) Drawing Type
(m) Drawing Number
(n) Data Source: Survey Grade GPS, Located in Field, Sub-Meter GPS, Georeferenced Drawing, AutoCAD Drawing, etc
(o) subtype: faucet, hydrant, sprinkler, unknown, other, etc.

1.4.11.10 NON Potable Water Well: CLJN.non-potable_water_well_point

Locate, GPS and collect the following attributes:

(a) Well ID: Facility Number
(b) Use:
(c) Well Status
(d) Station ID: Building Number
(e) Date Acquired: Year
(f) Disposition
(g) X Coordinates
(h) Y Coordinates
(i) Tank ID: Water Tank Facility Number
(j) Contract Number
(k) Drawing Type
(l) Drawing Number
(m) Data Source: Survey Grade GPS, Located in Field, Sub-Meter GPS,

Georeferenced Drawing, AutoCAD Drawing

1.4.11.11 Other Utility Features

All newly constructed features require GIS deliverables.

(a) Facility ID
(b) Installation Date
(c) Type/Description
(d) Material
(e) Size
(f) Drawing Number
(g) Contract Number
(h) Data Source: Survey Grade GPS, Sub-Meter GPS, Georeferenced Drawing, AutoCAD Drawing

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

-- End of Section --

PART 3

PROJECT PROGRAM

PART THREE - PROJECT PROGRAM

Project Program

French Creek Mess Hall
P1267
FY11
Category Code 722.10

French Creek Area
Marine Corps Base, Camp Lejeune, NC

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Part 3 contains the project description, functional and performance requirements, scope items, and expected quality levels that exceed Part 4. Part 4 identifies design criteria, verification requirements, and performance and quality requirements of products. See "Order of Precedence" paragraph in Part 2 for relationships between all parts of this RFP.

1.0 PROJECT DESCRIPTION

This project constructs a centrally located mess hall with a fast food area for the Marines and Sailors located in the French Creek area.

The work includes design and construction of a 21,840 SF single-story LEED Gold-certified enlisted Mess Hall with interior and exterior concrete masonry unit walls on pile foundations with structural steel framing, reinforced masonry, brick veneer, reinforced concrete foundation and floors and standing seam metal roof. This dining facility shall feature a walk-up window for food distribution, and an enclosed waiting area.

Built – in equipment includes: building emergency generator, dock leveler, spectrally selective window glazing, walk-in freezers, exterior storage shed, and energy management control system. Electrical systems include: power, lighting, and fire alarm. Mechanical systems include: plumbing, cooking oil recovery system, domestic water booster pump, fire protection, and HVAC. Information systems include telephone, data, local area network, voice and data communication, and mass notification. This project will require NGEN support.

Support facilities include: site lighting, paved parking and roadways, sidewalks, storage shed, miscellaneous concrete pads, stormwater management system, clearing and grubbing, earthwork, access roads, landscaping, and building and roadway signage. Site utility distribution systems include: electrical power, domestic water, fire protection water, sanitary sewer, stormwater management, natural gas, fire alarm, telephone, communication, fiber optics, and cable television.

The project will conform to UFC 4-722-01 Dining Facilities, UFC 4-010-01 anti-terrorism/ force protection standards, and follow LEED, low impact development and Federal Energy Acts compliance criteria for design, development, and construction of the project.

2.0 PROJECT OBJECTIVES

2.1 Mission Statement

An adequate enlisted dining facility is required for Marines and sailors assigned to the French Creek Area of Marine Corps Base Camp Lejeune. Project will provide a modernized consolidated messing facility to accommodate the organizational structure of Marine Corps personnel.

2.2 Facility Function

The function of the facility will be to provide modern state-of-the-art cafeteria-style dining for regular meals, specialty meals, and fast food service.

Dining facility functional design is driven by the number of personnel to be served, meal schedule and duration, payment style, food delivery and eating methodologies, and any additional functions accommodated in the specific facility. These functions and how they drive the design of the facility are described in detail in UFC 4-722-01, Ch2, Food Service Planning Determinations.

2.3 Project Specific Priorities

A kitchen planning professional consultant is required for the design of this project that is a member of Foodservice Consultants Society or other equal certifying organization.

Provide a solar hot water heating system and back-up system.

Exterior materials such as masonry, standing seam metal roofing, exterior metal finishes and colors selected for the building should adhere to the guidance contained in the MCB Camp Lejeune Base Exterior Architecture Plan.

2.3.1 Sustainable Design

Integrate sustainable strategies and features into the design to minimize the energy consumption of the facilities; conserve resources; minimize adverse effects to the environment; and improve occupant productivity, health, and comfort to reduce the total cost of ownership of the project using a whole building, life-cycle approach. In accordance with Engineering & Construction Bulletin 2008-01 and other directives, the facility and all site features shall be designed and constructed using USGBC LEED-NC. The design and construction shall incorporate sustainable design strategies and features to the fullest extent possible, consistent with mission, budget and client requirements.

The minimum sustainable design rating level for the project is to achieve LEED-NC Gold and the constructed facility shall be certified by the USGBC as having met the USGBC LEED-NC requirements for the required rating level. The constructed facility shall be Sustainable Validated by the contractor and NAVFAC as having met as many prerequisites and credits practical in the USGBC LEED-NC

The following LEED-NC v2.2 credits and additional requirements are mandatory unless not applicable to the project due to project scope.

a. SS-6.1 Storm Water Design, Quantity Control

b. SS-6.2 Storm Water Design, Quality Control

c. WE-1.1 Water Efficient Landscaping: Reduce by 50%

d. WE-3.1 Water Use Reduction: 20% Reduction

e. EA-1 Optimize Energy Performance. For new construction achieve a 30% energy use reduction below ASHRAE 90.1-2004 or the International Energy Conservation Code (IECC) for low rise residential facilities. For renovations, reduction shall be 20% below pre-renovations 2003 baseline. Reduction shall be calculated in accordance with US Code of Regulations 10 CFR 433, 434, 435 dated Dec. 4, 2006.

f. EA-4 Enhanced Refrigerant Management. Reduce use of Ozone Depleting and Global Warming Compounds. Eliminate the use of ozone depleting compounds during and after construction where alternative environmentally preferable products are available.

g. EA-5 Measurement and Verification. Install permanent building level meters on all utilities. Use the Energy Star Benchmarking Tool and enter measured data and lessons learned into the High Performance Buildings Database (www.eere.energy.gov/femp/highperformance/index.cfm)

h. MR-2.1 Construction Waste Management: Divert 50% from Disposal.

i. MR-4.1 Recycled Content: 10%. For EPA Designated products, use products meeting EPA's recycled content recommendations.

j. MR-6 & MR-7 Renewable Products: Use products made from rapidly renewable resources and certified sustainable wood products.

k. EQ-3.1 & EQ-3.2 Construction IAQ Management: During Construction & Before Occupancy

l. EQ-4.1, 4.2, 4.3, 4.4 Low Emitting Materials. Specify materials & products with low pollutant emissions, including adhesives, sealants, paints, carpet systems and furnishings.

m. EQ-7.1 Thermal Comfort: Design. Design to ASHRAE Standards 55-2004 for Thermal Comfort and 62.1-2004 for Ventilation for Acceptable Indoor Air Quality.

n. EQ-8.1 Daylight & Views. Achieve a minimum daylight factor of 2% excluding direct sunlight in 75% of all space occupied for critical visual tasks. Provide automatic dimming controls or accessible manual controls and appropriate glare control.

o. Moisture Control. Establish and implement a moisture control strategy for controlling moisture flows and condensation to prevent building damage and mold contamination.

p. Bio-Based Products: For USDA designated products use products meeting or exceeding USDA's biobased content recommendations.

q. Energy Efficient Products: All energy using products shall either be Energy Star or FEMP recommended efficiency. Where Energy Star or FEMP recommendations have not been established, efficiency shall be in the top 25% for the type of product procured. All energy using products shall also meet FEMP requirements for low standby power consumption.

Ensure sustainable strategies and features in the design phase are incorporated in the construction phase.

2.3.2 Energy Conservation

Energy conservation shall be in accordance with UFC 3-400-01, Design Energy Conservation.

Provide the following energy enhancements:

Air Barriers and Air Barrier Performance Testing.

LED Site and building lighting.

Solar domestic Hot water system.

Advanced Metering

Photovoltaic (PV) Panels

EMCS Intergration

2.3.3 Building Commissioning

Provide Enhanced Commissioning to meet the requirements of USGBC LEED Rating System version 2.2. and UFGS section 01 45 00.05 20, *Design and Construction Quality Control,* and UFGS section 01 33 29, *LEED Documentation*. At a minimum Commission the following systems: HVAC systems and controls, lighting controls, and if provided, day lighting controls, refrigeration systems and controls, renewable energy systems, and domestic hot water systems. See the following "Engineering System Requirements" sections in Chapter 6 of the Project Program to determine any additional systems to be commissioned.

The designated Commissioning Authority (CA) shall meet the qualifications of USGBC LEED Rating System version 2.2 and UFGS section 01 45 00.05 20, Design and Construction Quality Control. The CA shall report results, recommendations, and findings directly to the Government.

2.3.4 Accessibility Requirements

Provide barrier-free design in accordance with the requirements of the DEPSECDEF Memorandum "Access for People with Disabilities" dated Oct 31, 2008. The memorandum

updates the DoD standards for making facilities accessible to people with disabilities. The US Access Board issued an update of the accessibility guidelines which the DEPSECDEF Memorandum implements with military unique requirements specified in the memorandum attachment. The new DoD, "ABA (Architectural Barriers Act) Accessibility Standard" and the DEPSECDEF Memorandum are located at http://www.access-board.gov/ada%2Daba/aba-standards-dod.cfm .

2.3.5 Antiterrorism Criteria

Design the facility to comply with UFC 4-010-01, DoD Minimum Antiterrorism Standards for Buildings. UFC 4-010-01 is a multidiscipline UFC therefore all architectural/ engineering disciplines need to be aware of the requirements. For Example:

- Civil engineers need to be aware that UFC 4-010-01 will affect site location of buildings, roadways, parking, access roads, and landscaping.
- Mechanical engineers need to be aware that UFC 4-010-01 will affect air intake design and location, utility routing, mail room ventilation, HVAC controls, HVAC equipment support, and the site location of chillers, compressors and other heavy equipment.
- Electrical engineers need to be aware that UFC 4-010-01 will affect HVAC controls, utility routing, electrical equipment support, mass notification, and site location of substations, transformers, generators, and other heavy equipment.

Facility will have an occupancy designated as primary gathering in accordance with UFC 4-010-01.

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 is 28 meters 82 feet from parking and roadways.

Develop the site to provide the standoff requirements listed in UFC 4-010-01.The site is constrained and the conventional standoff distances are likely not available. Standoff distance may be reduced, but not less than the minimum standoff, if the required level of protection can be achieved through analysis, building hardening, or other mitigating construction as described in UFC 4-010-01.

2.4 Appropriate Design

It is important that the architecture of the building reflect the function of the facility as an Enlisted Dining Facility. The building layout shall foster efficient flow of people, materials, and work activities. It should also seek to visually and acoustically separate patron functions from food preparation and cleaning functions. The building form should project a positive and professional appearance that is inviting to potential patrons. The level of quality and durability specified shall be responsive to the function of a high-use military support structure. The design solution shall comply with UFC 4-722-01.

2.5 Workflow Process

Dining facility design must address the efficient movement of three things: Food, Utensils and Patrons. The facility must be laid out to promote the ease of food processing from delivery at the loading dock all the way to serving lines. The flow of dishes, pots and pans from clean storage to preparation and use and back again should be provided for in a most efficient manner. The experience of the patrons moving from check-in to queue to serving line to cashier to seating should be a pleasant one, minimizing confusion and crossing of circulation paths.

2.5.1 Hours Of Operation

Breakfast: 0600-0800

Lunch: 1000-1300

Dinner: 1630-1830

Breakfast/Brunch: 0900-1100*

Dinner/Brunch: 1500-1600*

(*) Weekends and Holidays

2.5.2 Staffing/Occupancy

The Current Messing requirement for this area of French Creek is 2,032 Personnel. The number of patrons listed below does not include the drive-up window patrons.

Type of Occupancy	No. of Persons	Description of Activity
Enlisted Patrons	575 max. seating – serving a total enlisted population of 2,032	Military Dining
Staff (military/ contractor)	30	Food Prep. and Serving
Maximum Occupancy	605	

2.6 Special Design Challenges

The design/build contractor's Food Service Design Consultant will need to work closely with the base's

food service officers so that specific local needs are addressed in the new facility and a successful integration is achieved by the drive-up window operation and local traffic patterns.

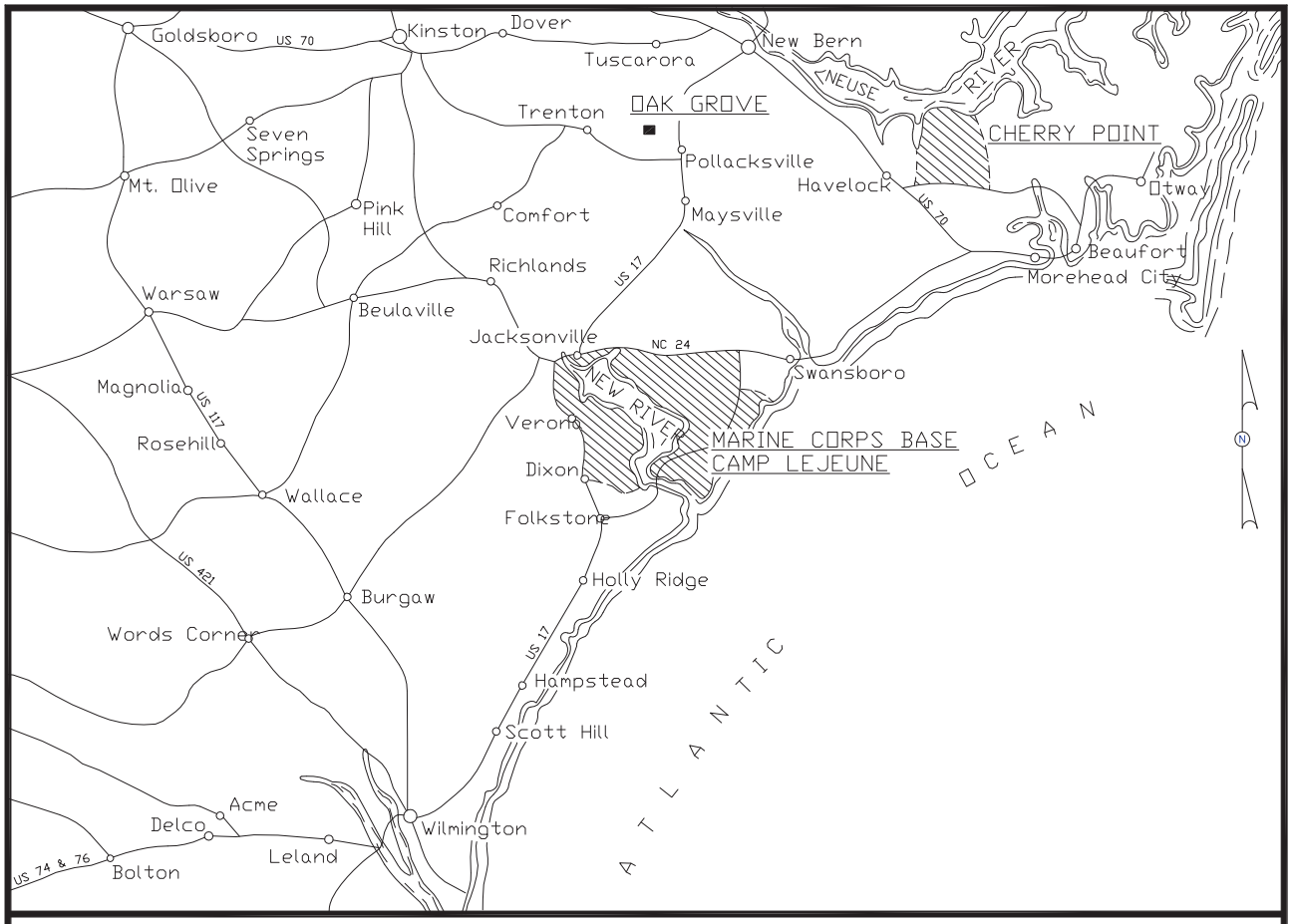
2.7 Adaptability And Flexibility

Headquarters Marine Corps certifies that this project has been considered for joint use potential. The Dining Facility can be used by other components on an “as available” basis; however, the scope of the project is based on Navy requirements.

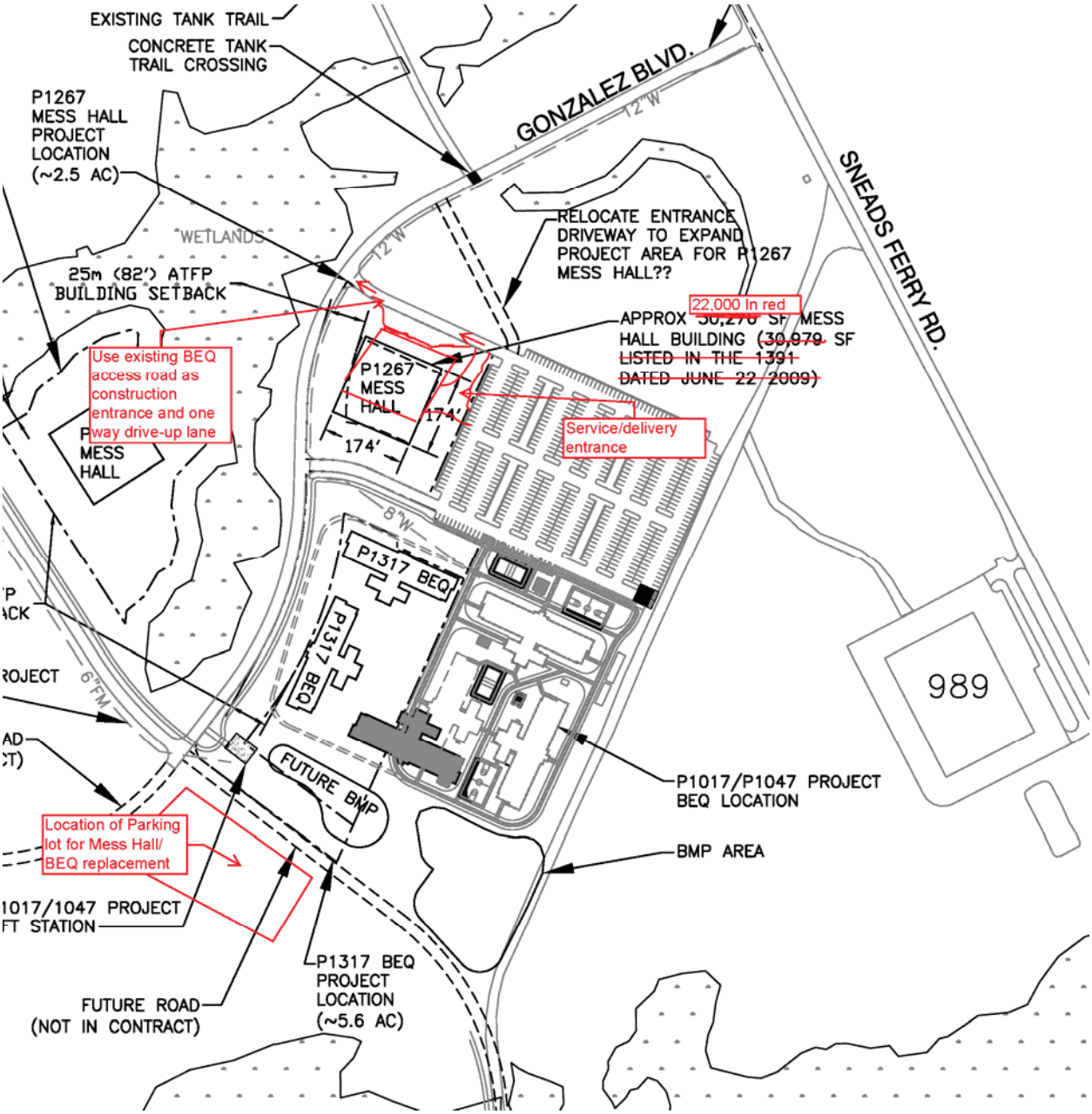
3.0 SITE ANALYSIS

3.1 Existing Site Conditions

3.1.1 Site Location-Vicinity Map



VICINITY MAP
NOT TO SCALE



LOCATION MAP
French Creek Mess Hall Site

This project involves design and construction of a 21,840 square foot Mess Hall at French Creek development site

A site vicinity map is included for the location.

3.1.2 Existing Site Conditions

Topography

This project is located at the French Creek area of MCB Camp Lejeune, North Carolina. The P1267 site is located adjacent to the existing P1017/P1047 BEQ site along a newly built Gonzalez Boulevard, just west of Sneads Ferry Road. The existing Mess Hall site is heavily wooded. The new parking area will be located where the extended Birch street and Gonzalez Boulevard meet (see Location Map). Photos of the site are included in section 3.6.

Site Utilities

Existing utilities within the project development site include but are not limited to a 12-inch water main along the west side of Sneads Ferry Road, a new 12 inch water line along the new Gonzalez Boulevard west of the site, a 10 inch water supply line south of the site along the access road to the BEQ parking area.

Also existing is a new sewer lift station at the intersection of Birch Street and Gonzalez Boulevard south of the site supplied by a 10” PVC gravity sewer line from the BEQ site southeast of the site.

Geotechnical Information

A Geotechnical report has been prepared for the P1267 French Creek Mess Hall project site and is included in Part 6, Attachments.

The soils information provided in this RFP is for reference only, and reflects the soil conditions encountered only at the locations indicated. This information shall not be used in the design or construction of the new facilities. The Contractor shall perform soils investigation at the site for use in the design and construction of the new facilities. A report including laboratory analysis of samples and recommendations for foundation and pavement design shall be prepared by a professional engineer in accordance with UFC 3-220-01N, *Geotechnical Engineering*.

Topographic Surveys

A topographic survey of the project site has been performed and is included in Part 6, Attachments.

The topographic survey has been provided to show the location of existing facilities, areas of new work required by this RFP and the character of the sites. The contractor is responsible for verifying the topographic survey and providing any additional topographic information that is required to prepare the detailed design of this project. The existence, size and/or location of utilities are not guaranteed by the surveys provided. The Contractor shall verify the location of all utilities prior to construction. Electronic files of the topographic survey will be provided to the Contractor **only after award of the contract**.

3.2 SITE DEVELOPMENT REQUIREMENTS

3.2.1 Building Demolition

The project site has no existing buildings. Demolition will not be required.

3.2.2 Building Footprint

The project includes the construction of a one-story 21,840 square feet mess hall including a 108 square feet telecommunications room. The dining facility will have a walk-up window for food distribution, an enclosed waiting/check-in area, and a receiving/loading dock. The existing access road to the BEQ parking will be converted to a one-way service/pick up parking lane after construction of a replacement access road coming from a point further east on Gonzalez Boulevard. The service entrance will be on the BEQ parking lot side of the building with access off the service lane and an exit thru the exiting parking area.

3.2.3 Vehicular Access and Circulation

Provide ingress/egress points and a connecting road between Gonzalez and the northwest corner of the existing BEQ parking lot. Provide a barrier system to prevent access to the service lane and service entrance during heightened security threat levels, see ESR G204004 for specific requirements. Provide convenient and safe vehicular access and circulation for essential services such as deliveries, trash and garbage collection, fire protection, maintenance and repair. Through traffic should be kept to a minimum. Design in accordance with criteria set forth in UFC 4-010-01 *DOD Minimum Antiterrorism Standards for Buildings*.

All exterior routes to the facility must be accessible to the disabled in accordance with the Uniform Federal Accessibility Standards (UFAS) and the Americans with Disabilities Act Accessibility Guidelines (ADAAG).

See UFC 3-200-10N, *Civil Engineering*, UFC 4-722-01, *Design Dining Facilities*, and UFC 4-721-10, *Facility Standards*, for requirements and guidance.

3.2.4 Anti-Terrorist Force Protection (ATFP) Requirements

This project will construct a primary gathering building and as such must be designed in accordance with the latest edition of UFC 4-010-01, *DOD Minimum Antiterrorism Standards for Building*. The area available for development on the site is limited by the ATFP standoff requirements. All parking, roadways, trash containers, and parking facility vehicular access shall be provided outside of the 82-foot building standoff distance for conventional construction.

3.2.5 Parking

French Creek Mess Hall

The parking requirement for this enlisted dining facility should provide 350 spaces located at the southeast corner of the intersection of Gonzalez and Birch (see location map). Provide 350 parking spaces and access drives in accordance with UFC 3-210-02, *POV Site Circulation and Parking, (*17,000 square meters of parking per 1391).

3.2.6 Dumpster Pads

Provide a concrete pavement pad and apron to support two dumpsters and the front wheels of the service truck. Provide masonry wall with brick veneer screen walls on three sides which are compatible with the building architecture. Locate pads for easy accessibility and minimum disruption of through traffic flows while also meeting ATFP standards. Dumpster pads and location should be adequate to meet the base recycling requirements. No gates are required.

3.2.7 Service Access

Provide a service access to Dining Facility's loading dock. The type of anticipated delivery vehicle (WB-50 Semitrailer) shall be taken into account when designing the maneuvering area for the delivery service area. Heavy duty bituminous concrete or Portland cement concrete (PCC) shall be provided for the delivery service area. Provisions for restricting access within the ATFP standoff area shall be provided through the use of drop arm barriers or other means. Refer to Chapter 6 (ESR) paragraph G204004 for specific security requirements.

3.2.8 Pedestrian Access and Circulation

Provide new concrete sidewalks and connect to existing sidewalks to provide a complete exterior circulation system for access between the new dining hall facility, BEQs and parking lots. Provide walkways and sidewalks in accordance with UFC 4-722-01, *Dining Facilities*. Include pedestrian crosswalk markings and signs for all road crossings.

3.2.9 Landscaping

Provide landscaping to include trees, shrubs, groundcovers, and turf. Landscaping features should be selected and place in accordance with the ATFP setback requirements. Landscaping should also work in conjunction with the civil site features to provide storm water retention to improve the storm water management of the site.

3.2.10 Site Utilities

Water

Fire protection shall be provided by a minimum 6-inch diameter water line to the new facility isolated by a post indicator valve (PIV). Provide additional fire hydrants to meet fire protection requirements. Provide domestic water service connections to the new facility. Tie proposed mains into the existing water lines of equal or larger diameter. For existing pipe sizes, see the topographic survey and the Plans for Project P1017/1047 located in Part 6 of this RFP.

Sanitary Sewer

The contractor shall determine if gravity sewer systems can serve the new dining hall building or if a new lift station will be required. Provide a minimum 8-inch diameter sanitary sewer main with minimum 4-inch service connection to the new facility. For existing pipe sizes, see topographic survey and the Plans for Project P1017/1047 located in Part 6 of this RFP. There will be an approximately 800 foot run of gravity sewer to connect to the lift station at the intersection of Birch and Gonzalez.

Natural Gas

Provide a concrete pad to land Natural Gas Metering equipment for supporting heating/cooking requirements for the Mess Hall. Placement and protection of meter and piping is to meet all safety and separation requirements. See Section 6 ESR G304004, "SITE CIVIL/MECHANICAL UTILITIES" for other natural gas system requirements.

Mechanical

See Section 6 ESR G304004, “SITE CIVIL/MECHANICAL UTILITIES” for Steam and condensate system requirements.

Telecommunications

See Section G4030 “SITE COMMUNICATION AND SECURITY”.

Cable TV

See Section G403004 “CABLE TV SYSTEMS (CATV)”.

Electrical

See Section G40 “SITE ELECTRICAL UTILITIES”.

3.2.11 Signage

The Mess Hall should be provided with Signage along Gonzalez road for identification of the mess hall and for directions into the parking and the drive through areas.

3.2.12 Storm Drainage

A new storm drainage system shall be provided to provide positive drainage away from all buildings, sidewalks and parking areas. Provide a new system of drainage ditches, culverts, swales and storm sewer system discharging to a stormwater management facility for the site. The storm drainage system and stormwater management facility shall be designed in accordance with North Carolina Department of Environment and Natural Resources (NCDENR), division of Water Quality criteria and policies and UFC 3-200-10N, *Civil Engineering*. Locate these BMP to take advantage of the existing topography and minimize cut and fill requirements

3.2.13 Stormwater Management

This project is located within the 20 Coastal Counties and within the White Oak River Basin. The receiving water, Wallace Creek, is classified as SB and NSW by the North Carolina Department of Environmental and Natural Resources.

Provide positive drainage away from the buildings and all roadways and parking areas. Ensure that the grading and associated stormwater runoff do not adversely affect surrounding sites. The use of Low Impact Development (LID) stormwater management strategies are required to be used to comply with Federal Energy Policy Act requirements and Department of Navy Low Impact Development (LID) Policy for Stormwater Management, Dated 16 November, 2007 (See Part 6 Attachments) XXX . Examples of LID devices include bioretention, dry wells, filter strips, grassed swales, infiltration trenches, permeable pavement/pavers, rainwater harvesting systems, rain barrels, and tree box filters. LID information is available in UFC 3-210-10, Low Impact Development and from the Low Impact Development Center, Inc, whose website can be found at www.lowimpactdevelopment.org/index.html.

The site shall be developed to comply with North Carolina Department of Environmental and Natural Resources (NCDENR), Division of Water Quality criteria and policies and UFC 3-200-10N, *Civil Engineering*.

For existing pipe sizes and drainage features, see the topographic survey located in Part 6, Attachments.

Wetlands have been identified east of the proposed site development area. No construction activities shall impact the wetland areas.

3.2.14 Site Clearing

Clearing will be necessary to accommodate the proposed dining hall building, parking lot and access roads.

3.2.15 Fencing

There is no fencing requirement beyond the requirements for screening of dumpster pad.

3.2.16 Construction Access/Lay Down Areas

The Contracting Officer will determine these locations at his discretion.

3.2.17 Permits

It is the Contractor's responsibility to ensure that all permits necessary for construction have been secured prior to beginning construction. The Contractor is responsible for all permit application fees. Permits and approvals required from the State of North Carolina's Department of Environmental and Natural Resources (NCDENR) include, but are not limited to:

Erosion and Sediment Control:

The successful contractor is responsible for preparing a Sedimentation and Erosion Control Plan in accordance with Chapter 4 of Title 15A of the North Carolina Administrative Code (T15A.04), and obtaining final plan and specification approval from NCDENR, Division of Land Quality. The North Carolina Erosion & Sediment Control Planning and Design Manual should be used when determining control measures. This publication can be found at http://www.dlr.enr.state.nc.us.

A completed Financial Responsibility/Ownership Application must be submitted, as well as plans and specifications, to the Camp Lejeune Public Works Officer to obtain Financial Responsibility/Ownership signatures and notarization.

Water Distribution System:

The successful contractor is responsible for submitting a complete design package and Engineer's Report in accordance with Title 15A: 18C.0307 to the NCDENR, Division of Water Quality and obtaining approval of the "Application for Approval of Engineering Plans and Specifications for Water Supply Systems," prior to constructing any water systems. A copy of the Application for Approval and related information can be accessed via the Public Water Supply Section website at www.deh.enr.state.nc.us/pws/index.htm.

A completed Permit Application for Approval must be submitted, as well as an Engineer's Report and plans/specifications, to the Camp Lejeune Public Works Officer to obtain Owner signatures. Please contact Camp Lejeune Public Works Office for proper Water System Management Plan (WSMP) No.

Sanitary Sewer:

The successful contractor is responsible for submitting a complete design package to the NCDENR, Division of Water Quality and obtaining a permit prior to beginning any sewer construction. Applications can be found at
http://h2o.enr.state.nc.us/wastewater.html.

A completed Permit Application for Approval must be submitted, as well as plans and specifications, to the Camp Lejeune Public Works Officer to obtain Owner signatures.

Stormwater Management Permit:

Storm drainage and stormwater management shall be designed in accordance with UFC 3-200-10N, *Civil Engineering* and the North Carolina Department of Environmental and Natural Resources (NCDENR) Division of Water Quality criteria and policies. The Contractor shall submit a permit application and obtain stormwater management permit approval to comply with 15A NCAC 02H of the North Carolina Administrative Code. The BMP manual can be found at http://h2o.enr.state.nc.us/su/bmp_forms.htm.

A completed Permit Application for Approval and BMP Operation and Maintenance Agreement form(s) must be submitted, as well as plans and specifications, to the Camp Lejeune Public Works Officer to obtain Owner signatures.

Wetland Permits:

No wetlands currently shown on the site.

Air Emission Permits:

Marine Corps Base, Camp Lejeune and Marine Corps Air Station, New River, have been issued one Clean Air Act Title V Construction and Operation Permit issued by NCDAQ. The facility is considered a major source for both criteria pollutants and federally listed Hazardous Air Pollutant (HAP). The facility is also subject to North Carolina Toxic Air Pollutant (TAP) regulations to include requirements for facility-wide air dispersion modeling and facility fence line emission limits for certain pollutants.

Any new regulated air emission source(s) will require a modified air quality permit for construction and operation in accordance with the North Carolina Department of Environment and Natural Resources (NCDENR) Division of Air Quality (NCDAQ) permitting procedures. The government will prepare a permit application package for all applicable emission sources in the contract. However, the contractor is required to coordinate submission of all Air Emissions Source Specification Data necessary for the preparation of the application package a minimum of 180 calendar days prior to any construction or installation of any emission source point associated with this project. See Specification No. 01 57 19.00 20 in Part 2, “General Requirements” for further information.

3.2.18 Geospatial Information System (GIS) Deliverables

Provide geospatial data and documentation for this project in accordance with the specifications outlined in Part 5, Prescriptive Specs, of this RFP. The contractor shall submit GIS data deliverables for review and approval by a reviewer in the Camp Lejeune Public Works GIS section.

4.0 BUILDING REQUIREMENTS

Space requirements for the P-1267 Dining Facility are summarized in the space tabulation summaries on the following pages. Area calculations are based on the number of personnel to be served in accordance with the Unified Facilities Criteria (UFC) 4-722-01 and NAVFAC P-80, Facility Planning Criteria for Navy and Marine Corps Shore Installations, category code 722. Total square footage to be designed and constructed may not exceed the following maximum allowable area:

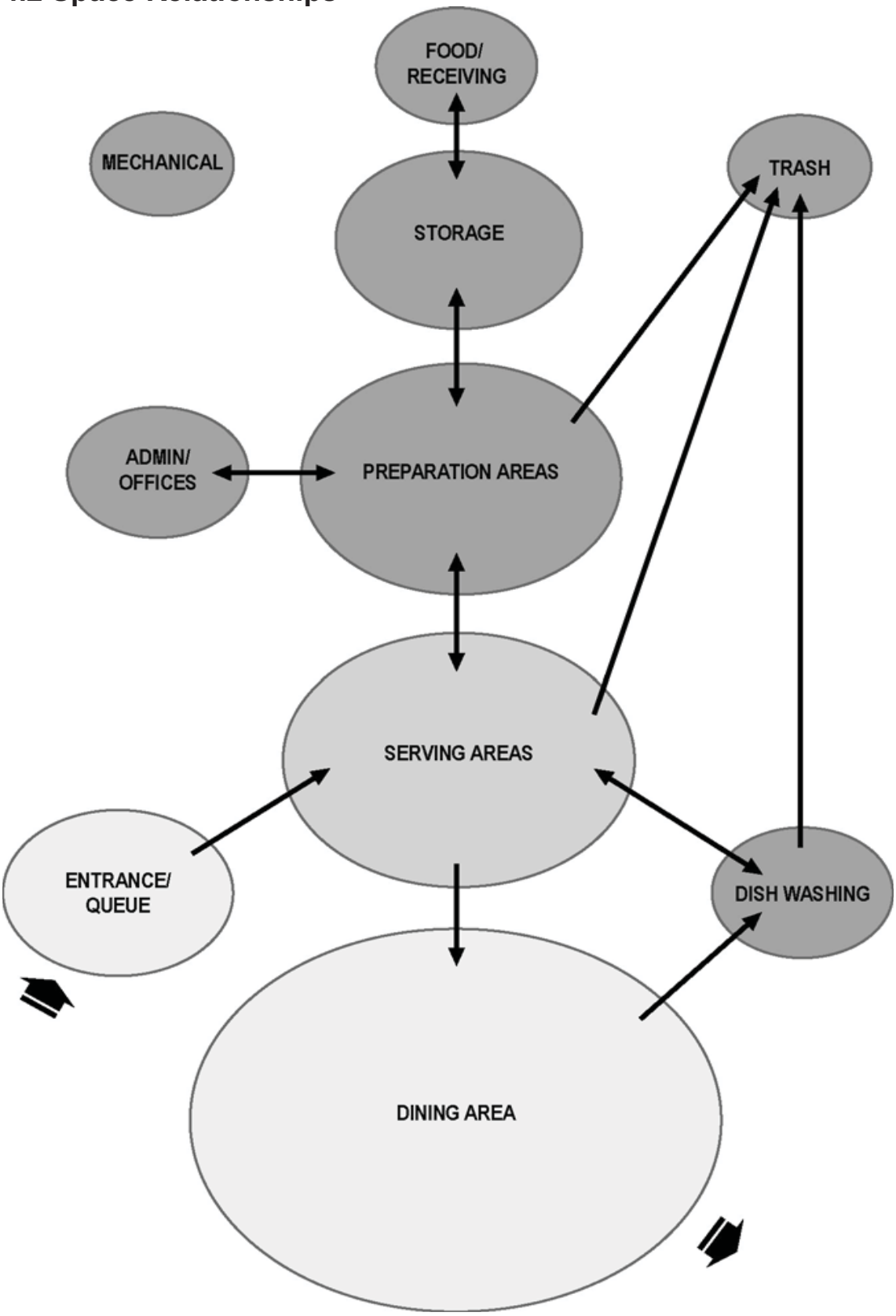
Dining Facility: 21,840 SF

4.1 Space Tabulation

Space Name	# of spaces	Unit SF	Total SF	Total SQM	Ideal Dimensions	Ceiling Height (ft)	Ceiling Height (cm)	# of Occupants	Remarks
Public Areas									
Entrance Lobby	1	180	180	16.72		12	365.76		
Dining Area	1	9632	9632	894.84		12	365.76		
Public Toilets	2	152	304	28.24		9	274.32		
Queue	3	312	936	86.96		12	365.76		
Sign-In Station	3	29	87	8.08		12	365.76		
Serving Areas									
Regular Food Line	2	450	900	83.61		12	365.76		
Fast Food Line	1	440	440	40.88		12	365.76		
Beverage Line	3	230	690	64.10		12	365.76		
Cashier Station	4	44.5	178	16.54		12	365.76		
Dish/Pot-Washing	2	366	732	68.01		10	304.8		
Preparation Areas									
Kitchen	1	850	850	78.97		10	304.8		
Fast Food Kitchen	1	450	450	41.81		10	304.8		
Vegetable Preparation	1	400	400	37.16		10	304.8		
Meat Preparation	1	450	450	41.81		10	304.8		
Bakery	1	418	418	38.83		10	304.8		
Utensil Wash	1	400	400	37.16		10	304.8		
Storage Areas									
Cook's Chill/ Freezer	1	350	350	32.52		10	304.8		
Fast Food Chill	1	108	108	10.03		10	304.8		
Dairy Chill	1	114	114	10.59		10	304.8		
Vegetable Chill	1	114	114	10.59		10	304.8		
Salad Room Chill	1	114	114	10.59		10	304.8		
Meat Chill	1	174	174	16.17		10	304.8		
Fast Food Freezer	1	108	108	10.03		10	304.8		
Meat Freezer	1	238	238	22.11		10	304.8		

Space Name	# of spaces	Unit SF	Total SF	Total SQM	Ideal Dimensions	Ceiling Height (ft)	Ceiling Height (cm)	# of Occupants	Remarks
Dry Storage	1	850	850	78.97		10	304.8		
Non-Food Storage	1	173	173	16.07		10	304.8		
Beverage/ Bread Storage	1	151	151	14.03		10	304.8		
Support Areas									
Offices	3	90	270	25.08		8	243.84		
Staff Toilets	2	190	380	35.30		9	274.32		
Staff Lockers/ Shower	2	216	432	40.13		9	274.32		
Janitor's Closet	2	45	90	8.36		9	274.32		
Can Wash	1	54	54	5.02		10	304.8		
Loading Dock (@ 50%)	1	360	360	33.45		14	426.72		
Tank Room	1	24	24	2.23		9	274.32		
Extractor	1	60	60	5.57		9	274.32		
Recycle Room	1	31	31	2.88		9	274.32		
Telecommunications	1	100	100	9.29		9	274.32		
Mechanical Room	1	200	200	18.58		Open			
Mech/ Boiler Room	1	100	100	9.29		Open			
Electrical Room	1	150	150	13.94		Open			
Field Feeding	1	48	48	4.46		8	243.84		
Building Services Areas			0	0.00		0	0		
Outdoor Dining Area			0	0.00			0		
Subtotal Net Area			21840	2029.00					
TOTAL GROSS AREA			**21840**	2029.00					
The design build contractor shall provide actual area in both square feet and square meters in proposals.									

4.2 Space Relationships



The relationship among the various storage, preparation, cooking, serving, and cleaning functions must be carefully studied to provide the maximum flow and efficiency. Keep travel distances short and minimize crossover of circulation paths. Maintain open sight lines as possible and utilize mobile food service equipment for flexibility. Provide utility connections for mobile food service equipment. Plan for various serving styles.

The interior of the building should provide a pleasant and functional environment for both the dining and meeting spaces, and the kitchen service areas. The building interior should be bright and easy to maintain. Finish materials should be light in color, durable and easy to clean. The colors, patterns, texture of materials, and overall composition of the interior design should be classical (i.e. not trendy).

The public dining areas should be inviting and comfortable. Public toilets should be provided near the main entry to the building to facilitate patron hand washing. These toilets should also be easy to access by patrons who are dining, yet private and out of direct view from the dining areas. An interior queue line should be provided of sufficient length to allow patrons to stand in a controlled environment protected from the exterior elements. The dining space should be divided into distinct areas. Any one dining area or combination of dining areas should be able to be closed off during times when the dining population is small in number. The building systems serving the individual dining areas should be independent from one another. This segregation of building systems is intended to save energy by allowing set backs or shut down of systems in areas that are not being utilized.

The queue line, dining areas and serving lines should have natural lighting. Windows should be provided in the exterior walls to allow views to the out-of doors. Skylights will not be allowed, but clerestory windows can be utilized to allow natural lighting to enter the central dining area. Windows in the interior partitions enclosing the central dining area can also be utilized to allow natural lighting to this space. The natural lighting and views to the dining areas and banquet hall should be controlled by blinds or similar devices since this space may serve as a meeting and presentation room.

The kitchen should provide a bright, functional environment that is easy to clean and maintain. The kitchen ventilation and environmental conditioning systems shall be designed in accordance with the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE). The kitchen must be environmentally, acoustically, and visually separated from the dining facilities to the maximum extent possible. Logical separation and grouping of subspaces within the kitchen is required along with functional spatial relationships. The kitchen design must incorporate logical work sequences that are efficient and minimize travel distance by kitchen staff.

The food serving lines must be efficient, logical and have simple circulation patterns that prevent pedestrian traffic conflicts. The kitchen design, its equipment layout and food service lines must be designed by a certified kitchen designer.

Some natural lighting should be provided for the main work spaces of the kitchen. The use of skylights will not be allowed. Clerestory windows and/or windows placed high in the exterior walls should be considered.

Space relationships for the new dining facility shall be in accordance with the guidance provided in the **UFC 4-722-01 Design: Dining Facilities**, and the design expertise of the Food Service Design Consultant as part of the Design/Build Contractor's team, which will be working closely with the base food service officer (Charlie Cone) and designated representatives of the base food service division at MCB Camp Lejeune during the design phase of the project. The concept design development of the facility will be accomplished during the Concept Deign Workshop (CDW) described in Part 2 general requirements, section 0131 19.05 20 Post Award Meetings.

4.3 Exterior Character

Emphasis is placed on the design of functional and pleasant food service facilities that help attract and retain patrons. The building design shall comply with Command and Installation architectural standards. The dining facility can represent a visual focal point on base, similar to a headquarters building, and its design can set the standard for the Installation. The exterior of the facility shall be veneered in brick to closely match the existing French Creek buildings. The contractor is encouraged to pursue a creative and imaginative design while abiding by the base standards and the needs of the LEED requirements.

Exterior windows shall be designed to meet UFC 4-010-01 minimum AT/ FP requirements as well as resist hurricane windborne debris for coastal areas. All exterior glazing shall consist of insulating glass with an inboard lite of laminated glass to meet “large missile” debris resistance below 25 feet in height, and “small missile” resistance for areas above 25 feet. Glazed exterior doors shall meet the same requirements as the windows.

Other materials typically used for daylighting are acceptable so long as they meet the same hurricane resistance requirements notes above.

5.0 ROOM REQUIREMENTS

ENTRANCE LOBBY

Space Characteristics

Function/adjacencies: The entrance lobby is the main entrance to the facility.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 10 ft. (3.05 m)

Acoustics:

Access: Staff and public Vestibule is accessed from the exterior leading into the Queue Area of Dining Hall

Number of Occupants: based on personnel to be served and turnover rate.

Other/special requirements: Provide a canopy and enclosure for patrons who arrive in advance of the opening of the facility. In extreme weather areas, this function can be accomplished in the form of a vestibule. Display area for Installation memorabilia, insignias and flags. Lighting in this area to be down lights and/or wall washers to accent memorabilia.

Uniformat Level 4#	Description	Qty	Size	Remarks
B201011	Sun Control Devices	EA		Aluminum as required
B202001	Windows	EA		Meet ATFP criteria; thermal break frames
B202002	Storefront	SM		At main/ secondary entrance. Exterior doors shall have continuous or heavy-duty hinges.
B202004	Exterior Glazing	SM		Low ‘E’ clear glass, laminated glass etc.
B203002	Glazed Doors	EA		Provide Aluminum Storefront System. Exterior doors shall have continuous or heavy-duty hinges.
C101001	Fixed Partitions	SF		Concrete or Concrete Masonry Units ,Exterior brick brought into vestibule area up to 48” high
C102007	Interior Door Hardware	A/R		
C301001	Interior Painting	SF		Painted Finishes to Concrete or Block wall surfaces above 48” AFF
C103014	Entrance Floor Grilles and Mats	SF	Door to door, and 12” wider than opening.	Recessed Mat Aluminum Frame Requirements - Recessed into floor slab, aluminum frame with inserts. See LEED, IEQ Cr. 5 for mat requirements.
C302001	Floor Finishes	SF		Porcelain floor tile finish .Min 12’x12’
C302001	Tile Base Finish	SF		Porcelain Tile finish to match floor
C303001	Acoustical Ceiling	SF		Suspended acoustic ceiling materials 24”s24” tegular reveal
C303005	Suspension System			Exposed suspended acoustical ceiling grid
D30	HVAC			As described in the system description
D4010	Remote Annunciator Panel	EA		
D502002	Electrical			Exterior wall sconces
D502002	Lighting			Down lights and wall washers
E201002	Window Treatments	EA		Manually Operated light filtering solar shades

DINING AREA

Space Characteristics

Function/adjacencies: The dining area accommodates patron eating and relaxation. Provide seating for minimum 500 patrons and circulation space for same.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 12 ft. (3.66 m)

Acoustics: Provide measures to attenuate sand reverberation in the space. Provide wall treatments above wainscot height with a minimum .8 NRC rating; floor tile system minimum .35 NRC rating; ceiling minimum .6 NRC rating.

Access: Staff and public

Number of Occupants: based on personnel to be served, turnover rate, and staffing plan

Other/special requirements: The design must be coordinated with the food delivery methodology and bussing approach. Provide high ceilings and introduction of ample filtered and/ or indirect natural light. Including vertical roof glazing (clerestory) and large windows. Provide recessed entry/exit with overhang for fast food area and side exits. Separate dining area into three dining areas using walls and architectural features. Dropped soffits and down lighting are to be used to break up the ceiling, accentuate the serving line and highlight graphics and artwork.

Uniformat Level 4#	Description	Qty	Size	Remarks
B201011	Sun Control Devices (Exterior)	EA		Aluminum as required.
B202001	Windows	EA		Low 'E' clear glass, laminated glass etc., window sills to be solid surface material
B202002	Storefronts	EA		At main/ Secondary entrances
B202004	Exterior Glazing	SF		Low 'E' clear glass, laminated glass etc.
B203001	Glazed Doors	EA		
C101001	Fixed Partitions	SF		Interior GWB and metal stud
C102001	Standard Interior Doors	EA		
C102007	Interior Door Hardware	EA		Hinges, Locks, and Latches, Cylinders and Cores, Keys, Lock Trim, Door Stops and Silencers, kick plates.
C103008	Counters	LF		Solid Surface Material - Provide 4" high solid-surface back and side splash along countertop perimeter.
C103009	Cabinets	LF		Base Cabinets
C301090	Corner Guards	LF		Stainless Steel up to 48"
C302001	Floor		12"x12" min	Porcelain Floor Tile –Provide tile pattern with different tile sizes
C301005	Walls			Painted Finishes to Gypsum Board Wall Surfaces
C302001	Tile Base			Porcelain Tile Base, match floor
C303001	Acoustical Ceiling Panels		24"x24"	Suspended acoustic ceiling materials. Tegular reveal edge
C303005	Suspension Systems			Exposed Suspended Acoustical Ceiling Grid
C303002	Gypsum Wallboard Ceiling			Painted
D30	HVAC			As described in the system description
D502002	Lighting			Down lights and Direct/Indirect recessed fluorescent lighting to be switched in Zones
E102009	Audiovisual Equipment	EA		Provide fully articulating universal mounting bracket for TV's to be visual from all dining patrons., mounted at 18" below ceiling. Menu boards locations TBD
E109002	Food Service Equipment	EA		See Part 6 - Attachments
E201002	Window Treatments			Manually operated light filtering solar shades
E201002	CATV/Electrical			CATV and elect. Outlets to support TV's

PUBLIC TOILETS

Space Characteristics

Function/adjacencies: Public use, ADA facilities. Adjacent to main entrance.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 9 ft. (2.47 m)

Acoustics: Partitions shall extend to underside of room deck.

Access: Staff and Public

Number of Occupants: based on personnel to be served and turnover rate.

Other/special requirements: ADA compliant. Design toilets to 80/20 male to female patrons ratio.

Uniformat Level 4#	Description	Qty	Size	Remarks
C101001	Fixed Partitions	SF		Concrete Masonry
C102001	Standard Interior Doors	EA	Varies	
C102001	Wood Doors –Flush Doors			Solid core, stain grade
C102007	Interior Door Hardware	EA		Hinges, Kickplates, Closers, Push/Pulls, Door Stops, Silencers.
C103001	Compartments, Cubicles, & Toilet Partitions	SF		ADA Compliant, Solid Plastic or Phenolic
C103002	Toilet and Bath Accessories	EA		Stainless steel finish :Double Toilet Tissue Dispensers, Recessed Combination Motion Sensored Paper Towel Dispenser/Disposer. Grab Bars, Coat Hooks, Soap Dispensers., Sanitary napkin disposal (women only) Wall Mirror(same length as counter top)and Full length mirror.
C103008	Counters	LF		Solid Surface Material - Provide 4” high solid-surface back and side splash along countertop perimeter.
C301004	Walls			Porcelain Tile wall Min 6”x6” up to 72” AFF with accent tile border.
C302001	Floor		Min 12”x12”	Porcelain tile. Porcelain Floor Tile –Provide tile pattern with different tile sizes
C302001	Tile Base			Porcelain Tile Base match floor
C303002	Gypsum Ceiling			Moisture Resistant Gypsum Board
C304001	Painting			Paint ceilings and walls
D201001	Water Closets			Floor mounted flush valve type
D201002	Urinals			
D201003	Lavatories			Solid surface integral to counter top
D304007	Exhaust system			
D509003	Electrical			GFI at the sink area in each restroom
D502002	Electrical			Direct/indirect recessed 2x2 fluorescent
D502002	Electrical			Decorative wall mounted light fixture over vanity area.

QUEUE

Space Characteristics

Function/adjacencies: The queue is the space between the entrance lobby and the serving area and allows customers space to line-up to enter the serving area.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 12 ft. (3.66 m)

Acoustics: Visual and acoustical separation from dining area.

Access: staff and public

Number of Occupants: based on personnel to be served and turnover rate.

Other/special requirements:

Uniformat Level 4#	Description	Qty	Size	Remarks
B202001	Windows	EA		Meet ATFP criteria; thermal break frames.
B202004	Exterior Glazing	SF		Low 'E' clear glass, laminated glass etc.
C101001	Fixed Partitions	SF		Concrete Masonry
C101001	Fixed Partitions	SF		Interior GWB and metal stud
C301004	Walls Finishes	SF	6"x6" min	Porcelain tile wainscot up to 48" AFF, Paint above
C301090	Corner Guards	LF		Stainless Steel up to 48"
C304001	Wall Paint	SF		Paint wall accent color above 48"
C302001	Floor		12"x12" min	Porcelain Floor Tile –Provide tile pattern with different tile sizes
C302001	Tile Base			Porcelain Tile Base match floor
E102009	Audiovisual Equipment	EA		Provide a main menu board. Coordinate the size, design and location of the menu board with the 21-day menu and the serving methodology.
C303001	Acoustical Ceiling Panels		24"x24"	Suspended acoustic ceiling materials.24"x24" tegular revel edge
C303005	Suspension Systems			Exposed Suspended Acoustical Ceiling Grid
C303002	Gypsum Wallboard Ceiling			Painted
D30	HVAC			As described in the system description
D502002	Lighting			Down lights and Direct/Indirect recessed fluorescent lighting to be switched in Zones
E201002	Window Treatments			Manually operated light filtering solar shades

SIGN-IN STATION

Space Characteristics

Function/adjacencies: Service center for patrons to pay for meal service.
Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 12 ft. (3.66 m)

Acoustics:

Access: staff and public

Number of Occupants: based on personnel to be served and turnover rate.

Other/special requirements: Stand up height Sign in counter with integral stool,

Uniformat Level 4#	Description	Qty	Size	Remarks
C101001	Fixed Partitions	SF		GWB and metal studs
C103008	Counters	SF		Modesty panel full height with accent acrylic panel
C301004	Walls Finishes	SF	6”x6” min	Porcelain tile wainscot up to 48” AFF, Paint above
C304001	Wall Paint	SF		
C301090	Corner Guards	LF		Stainless Steel up to 48”
C302001	Floor	SF	12”x12” min	Porcelain Floor Tile –Provide tile pattern with different tile sizes
C302001	Tile Base	FL		Porcelain Tile Base match floor
C103008	Counters	LF		Solid Surface Material -
C103010	Casework			Built in desk stand up height with room for computer monitor
C303001	Acoustical Ceiling Panels		24”x24”	Suspended acoustic ceiling materials. 24”x24” tegular reveal edge
C303005	Suspension Systems			Exposed Suspended Acoustical Ceiling Grid 9/16”
C30002	Gypsum Wallboard Ceiling			Painted
D30	HVAC			As described in the system description
D502002	Lighting			Down lights and Direct/Indirect recessed fluorescent lighting to be switched in Zones

REGULAR FOOD LINE

Space Characteristics

Function/adjacencies: The serving area accommodates ordering and delivery of food to customers.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 12 ft. (3.66 m)

Acoustics:

Access: Staff and public

Number of Occupants: based on personnel to be served, turnover rate, and staffing plan.

Other/special requirements: The design of the serving area impacts the serving capacity and must be coordinated with queue and dining area Provide counters, casework, tray rails, and other interior construction as necessary to accommodate the food delivery methodology. Dropped soffit over this area to accentuate serving line.

Uniformat Level 4#	Description	Qty	Size	Remarks
C101001	Fixed Partitions	SF		GWB and metal studs
C301004	Wall Finishes	SF		Full Height Tile -Porcelain wainscot 48”and ceramic tile accent above.
C301090	Corner Guards	LF		Stainless Steel up to 48”
C302001	Floor Finishes	SF	12”x12” min	Porcelain Floor Tile –Provide tile pattern with different tile sizes
C302001	Tile Base	FL		Porcelain Tile Base match floor
C303002	Ceiling	SF		Moisture Resistant Gypsum Board
D2010	Plumbing	SF		Provide fixtures as necessary to accommodate the food delivery methodology.
E102009	Audiovisual Equipment	EA		Provide T.V.’s and menu boards.
E109002	Food Service Equipment	A/R		Provide equipment as necessary to accommodate the food delivery methodology.
C103008	Counters	LF		Solid Surface Material - with accent material on front of counter
D502002	Lighting			Direct/Indirect recessed fluorescent lighting with accent lighting at soffit of serving line

FAST FOOD LINE

Space Characteristics

Function/adjacencies: The serving area accommodates ordering and delivery of fast food to customers. Adjacent to dining.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 12 ft. (3.66 m)

Acoustics:

Access: Direct access to exterior .

Number of Occupants: based on personnel to be served and turnover rate.

Other/special requirements: Separate different dining areas using furniture and architectural features. Dropped soffits and down lighting are to be used to break up the ceiling, accentuate the serving line and highlight graphics and artwork.

Uniformat Level 4#	Description	Qty	Size	Remarks
C101001	Fixed Partitions	SF		GWB and metal studs
C301004	Wall Finishes	SF		Full Height Tile -Porcelain wainscot 48”and ceramic tile accent above.
C301090	Corner Guards	LF		Stainless Steel up to 48”
C302001	Floor Finishes	SF	12”x12” min	Porcelain Floor Tile –Provide tile pattern with different tile sizes
C302001	Tile Base	FL		Porcelain Tile Base match floor
C303001	Acoustical Ceiling Panels		24”x24”	Suspended acoustic ceiling materials. revel edge
D20100	Plumbing	SF		Provide fixtures as necessary to accommodate the food delivery methodology.
C303005	Acoustical Ceiling Grid		24”x24”	Exposed suspended acoustic ceiling grid
E102009	Audiovisual Equipment	EA		Provide T.V.’s and menu boards.
E109002	Food Service Equipment	A/R		Provide equipment as necessary to accommodate the food delivery methodology.
C103008	Counters	LF		Solid Surface Material - With accent material on front of counter
D502002	Lighting			Direct/Indirect recessed fluorescent lighting with accent lighting at soffit of serving line

BEVERAGE LINE

Space Characteristics

Function/adjacencies: The serving area accommodates ordering and delivery of food to customers. Adjacent to dining.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 12 ft. (3.66 m)

Acoustics:

Access: Staff and public

Number of Occupants: based on personnel to be served, turnover rate, and staffing plan.

Other/special requirements: Dropped soffits in this area are not to be lower than 11'6 over ice or beverage machines.

Uniformat Level 4#	Description	Qty	Size	Remarks
C101001	Fixed Partitions	SF		GWB and metal studs
C301004	Wall Finishes	SF		Full Height Tile -Porcelain wainscot 48"and ceramic tile accent above.
C301090	Corner Guards	LF		Stainless Steel up to 48"
C302001	Floor Finishes	SF	12"x12" min	Porcelain Floor Tile –Provide tile pattern with different tile sizes
C302001	Tile Base	FL		Porcelain Tile Base match floor
C303001	Acoustical Ceiling Panels		24"x24"	Suspended acoustic ceiling materials. revel edge
C303002	Gypsum Wallboard Ceiling Finishes			Painted
C303005	Suspension Systems			Exposed Suspended Acoustical Ceiling Grid
D2010	Plumbing	SF		Provide fixtures as necessary to accommodate the food delivery methodology.
E109002	Food Service Equipment	A/R		Provide equipment as necessary to accommodate the food delivery methodology. Provide freestanding water cooled Ice Maker.
C103008	Counters	LF		Solid Surface Material -

CASHIER STATION

Space Characteristics

Function/adjacencies: The cashier station accommodates patron payment. Provide at the end of each serving line.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 12 ft. (3.66 m)

Acoustics:

Access: Staff and public

Number of Occupants: based on personnel to be served, turnover rate, and staffing plan.

Other/special requirements: Payment options (cash, credit, Smart™ cards) will be determined prior to design.

Uniformat Level 4#	Description	Qty	Size	Remarks
C101001	Fixed Partitions	SF		GWB and metal studs
C301004	Wall Finishes	SF		Full Height Tile -Porcelain wainscot 48”and ceramic tile accent above.
C302001	Floor Finishes	SF	12”x12” min	Porcelain Floor Tile –Provide tile pattern with different tile sizes
C302001	Tile Base	FL		Porcelain Tile Base match floor
C303002	Ceiling	SF		Gypsum Board
E102009	Computer Equipment	EA		
C103008	Counters	LF		Solid Surface Material -
D502002	Lighting			Direct/Indirect recessed fluorescent lighting with accent lighting at soffit of serving line

DISH/POT WASHING

Space Characteristics

Function/adjacencies: Area for cleaning and sanitation of food preparation utensils and customer dishes and utensils. Convenient to dining area.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 10 ft. (3.05 m)

Acoustics: 50 STC. Provide baffles/screens on openings to the dining area.

Access: Staff

Number of Occupants: based on staffing plan

Other/special requirements: Provide pass window for dish collection. Provide 2 dishwashing areas, at either end of the service line accessible to the Kitchens.

Uniformat Level 4#	Description	Qty	Size	Remarks
C1001001	Fixed Partitions	SF		Concrete Masonry Partitions
C102001	Standard Interior Doors	EA	Varies	
C102007	Interior Door Hardware	A/R		Hinges, Kick plates, Closers, Push/Pulls, Door Stops, Silencers
C301004	Walls		4x4	Ceramic tile Floor to Ceiling
C302001	Floor		12”x12’ min	Quarry Tile with epoxy grout
C302001	Tile Base			Quarry tile Match flooring
C303003	Ceiling			Veneer Plaster painted
D2010	Plumbing - Fixtures			Provide fixtures as necessary to accommodate the number of personnel to be served, bussing considerations, the food delivery methodology, and the menu.
D2090	Plumbing - Other			Provide systems per UFC 4-722-01 (Rev.) Chapter 3, Plumbing.
D502002	Lighting			2x4 recessed fluorescent troffer with prismatic lense
E109002	Food Service Equipment			Provide equipment as necessary to accommodate the number of personnel to be served, bussing considerations, the food delivery methodology, and the menu. Provide Accumulators in both dishwashing areas. Provide small pot washing machine in one dishwashing area.

KITCHEN

Space Characteristics

Function/adjacencies: Area for preparation of all food. Adjacent to food storage, preparation, and serving

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 10 ft. (3.05 m)

Acoustics: 50 STC. Provide baffles/screens on openings to the dining area.

Access: Staff

Number of Occupants: based on staffing plan

Other/special requirements: Coordinate utility locations for food service equipment.

Uniformat Level 4#	Description	Qty	Size	Remarks
B202001	Exterior Windows	EA		Meet ATFP criteria; thermal break frames
B202004	Exterior Glazing	SF		Low 'E' clear glass, laminated glass etc.
B202099	Other Exterior Windows (Pass-Thru Windows)	2		As required at drive-thru food service.
C101001	Fixed Partitions	SF		Concrete Masonry Partitions
C102001	Standard Interior Doors	EA	Varies	Steel Frames all doors
C102007	Interior Door Hardware	A/R		Hinges, kickplates, closers, Push/Pulls, Door Stops, Silencers. Provide high impact plastic doors with bumper guards between serving lines and kitchen.
C301004	Walls		4x4	Ceramic tile Floor to Ceiling
C301090	Corner Guards			Stainless
C302001	Floor		12"x12' min	Quarry Tile with epoxy grout
C302001	Tile Base			Quarry tile Match flooring
C303003	Ceiling			Veneer Plaster painted
D203003	Floor Drains	A/R		
D2090	Plumbing – Other			Provide systems per UFC 4-722-01 (Rev.) Chapter 3, Plumbing.
D40	Fire protection			Provide system per UFC 4-722-01 (Rev.) Chapter 3, Fire Protection and Life Safety.
D50	Electrical			Provide system per UFC 4-722-01 (Rev.) Chapter 3, Electrical.
E109002	Food Service Equipment			Provide equipment as necessary to accommodate the number of personnel to be served, the food delivery methodology, the menu, the bussing style and the storage capacities.

FAST FOOD KITCHEN

Space Characteristics

Function/adjacencies: Area for preparation of fast food. Adjacent to food storage, preparation, and serving lines.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 10 ft. (3.05 m)

Acoustics: 50 STC. Provide baffles/screens on openings to the dining area.

Access: Staff

Number of Occupants: based on staffing plan

Other/special requirements: Coordinate utility locations for food service equipment.

Uniformat Level 4#	Description	Qty	Size	Remarks
B202001	Exterior Windows	EA		Meet ATFP criteria; thermal break frames
B202004	Exterior Glazing	SF		Low 'E' clear glass, laminated glass etc.
B202099	Other Exterior Windows (Pass-Thru Windows)	2		As required at drive-thru food service. One window for pay and one window for pick-up.
C101001	Fixed Partitions	SF		Provide food prep counters and storage construction as necessary to accommodate the number of personnel to be served, the food delivery methodology, the menu, the bussing style and the storage capacities.
C102001	Steel Doors	EA	Varies	Steel Frames all doors
C102007	Interior Door Hardware	A/R		Hinges, kickplates, closers, Push/Pulls, Door Stops, Silencers. Provide high impact plastic doors with bumper guards between serving lines and kitchen.
C301004	Walls		4x4	Ceramic tile Floor to Ceiling
C302001	Floor		12"x12' min	Quarry Tile with epoxy grout
C301090	Corner Guards			Stainless
C302001	Tile Base			Quarry tile Match flooring
C303003	Ceiling			Veneer Plaster painted
D203003	Floor Drains	A/R		
D2090	Plumbing – Other			Provide systems per UFC 4-722-01 (Rev.) Chapter 3, Plumbing.
D40	Fire protection			Provide system per UFC 4-722-01 (Rev.) Chapter 3, Fire Protection and Life Safety.
D50	Electrical			Provide system per UFC 4-722-01 (Rev.) Chapter 3, Electrical.
E109002	Food Service Equipment			Provide equipment as necessary to accommodate the number of personnel to be served, the food delivery methodology, the menu, the bussing style and the storage capacities.

VEGETABLE PREP

Space Characteristics

Function/adjacencies: Area for preparation of pre-cooked vegetables. Adjacent to kitchen.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 10 ft. (3.05 m)

Acoustics:

Access: Staff

Number of Occupants: based on staffing plan

Other/special requirements:

Uniformat Level 4#	Description	Qty	Size	Remarks
C101001	Fixed Partitions	SF		Concrete masonry paratitions
C102001	Steel Doors	EA	Varies	Steel Frames all doors
C102007	Interior Door Hardware	A/R		Hinges, kickplates, closers, Push/Pulls, Door Stops, Silencers.
C301004	Walls		4x4	Ceramic tile Floor to Ceiling
C302001	Floor		12”x12’ min	Quarry Tile with epoxy grout
C301090	Corner Guards			Stainless
C302001	Tile Base			Quarry tile Match flooring
C303003	Ceiling			Veneer Plaster painted
D203003	Floor Drains	A/R		
D2090	Plumbing – Other			Provide systems per UFC 4-722-01 (Rev.) Chapter 3, Plumbing.
D40	Fire protection			Provide system per UFC 4-722-01 (Rev.) Chapter 3, Fire Protection and Life Safety.
D50	Electrical			Provide system per UFC 4-722-01 (Rev.) Chapter 3, Electrical.
E109002	Food Service Equipment			Provide equipment as necessary to accommodate the number of personnel to be served, the food delivery methodology, the menu, the bussing style and the storage capacities.

MEAT PREP

Space Characteristics

Function/adjacencies: Area for preparation of meats. Adjacent to kitchen.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 10 ft. (3.05 m)

Acoustics:

Access: Staff

Number of Occupants: based on staffing plan

Other/special requirements:

Uniformat Level 4#	Description	Qty	Size	Remarks
C101001	Fixed Partitions	SF		Provide food prep counters and storage construction as necessary to accommodate the number of personnel to be served, the food delivery methodology, the menu, the bussing style and the storage capacities.
C102001	Steel Doors	EA	Varies	Steel Frames all doors
C102007	Interior Door Hardware	A/R		Hinges, kickplates, closers, Push/Pulls, Door Stops, Silencers.
C301004	Walls		4x4	Ceramic tile Floor to Ceiling
C301090	Corner Guards			Stainless
C302001	Floor		12”x12’ min	Quarry Tile with epoxy grout
C302001	Tile Base			Quarry tile Match flooring
C303003	Ceiling			Veneer Plaster painted
D203003	Floor Drains	A/R		
D2090	Plumbing – Other			Provide systems per UFC 4-722-01 (Rev.) Chapter 3, Plumbing.
D40	Fire protection			Provide system per UFC 4-722-01 (Rev.) Chapter 3, Fire Protection and Life Safety.
D50	Electrical			Provide system per UFC 4-722-01 (Rev.) Chapter 3, Electrical.
E109002	Food Service Equipment			Provide equipment as necessary to accommodate the number of personnel to be served, the food delivery methodology, the menu, the bussing style and the storage capacities.

BAKERY

Space Characteristics

Function/adjacencies: Area for preparation of pastries and bread products (sandwich bread purchased locally).

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 10 ft. (3.05 m)

Acoustics: 50 STC. Provide baffles/screens on openings to the dining area.

Access: Staff

Number of Occupants: based on staffing plan

Other/special requirements: Provide food prep counters and storage construction as necessary to accommodate the number of personnel to be served, the food delivery methodology, the menu, the bussing style and the storage capacities.

Uniformat Level 4#	Description	Qty	Size	Remarks
C101001	Fixed Partitions	SF		Concrete Masonry Partitions
C102001	Steel Doors	EA	Varies	Steel Frames all doors
C102007	Interior Door Hardware	A/R		Hinges, kickplates, closers, Push/Pulls, Door Stops, Silencers.
C301004	Walls		4x4	Ceramic tile Floor to Ceiling
C301090	Corner Guards			Stainless
C302001	Floor		12”x12’ min	Quarry Tile with epoxy grout
C302001	Tile Base			Quarry tile Match flooring
C303003	Ceiling			Veneer Plaster painted
D203003	Floor Drains	A/R		
D2090	Plumbing – Other			Provide systems per UFC 4-722-01 (Rev.) Chapter 3, Plumbing.
D40	Fire protection			Provide system per UFC 4-722-01 (Rev.) Chapter 3, Fire Protection and Life Safety.
D50	Electrical			Provide system per UFC 4-722-01 (Rev.) Chapter 3, Electrical.
E109002	Food Service Equipment	A/R		Provide equipment as necessary to accommodate the number of personnel to be served, the food delivery methodology, the menu, the bussing style and the storage capacities.

UTENSIL WASH

Space Characteristics

Function/adjacencies: Area for washing utensils pots and pans. Adjacent to kitchen.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 10 ft. (3.05 m)

Acoustics: 50 STC. Provide baffles/screens on openings to the dining area.

Access: Staff

Number of Occupants: based on staffing plan

Other/special requirements:

Uniformat Level 4#	Description	Qty	Size	Remarks
C101001	Fixed Partitions	SF		Provide food prep counters and storage construction as necessary to accommodate the number of personnel to be served, the food delivery methodology, the menu, the bussing style and the storage capacities.
C102001	Steel Doors	EA	Varies	Steel Frames all doors
C102007	Interior Door Hardware	A/R		Hinges, kickplates, closers, Push/Pulls, Door Stops, Silencers.
C301090	Corner Guards			Stainless
C301004	Walls		4x4	Ceramic tile Floor to Ceiling
C302001	Floor		12”x12’ min	Quarry Tile with epoxy grout
C302001	Tile Base			Quarry tile Match flooring
C303003	Ceiling			Veneer Plaster painted
D203003	Floor Drains	A/R		
D2090	Plumbing – Other			Provide systems per UFC 4-722-01 (Rev.) Chapter 3, Plumbing.
D40	Fire protection			Provide system per UFC 4-722-01 (Rev.) Chapter 3, Fire Protection and Life Safety.
D50	Electrical			Provide system per UFC 4-722-01 (Rev.) Chapter 3, Electrical.
E109002	Food Service Equipment			Provide equipment as necessary to accommodate the number of personnel to be served, the food delivery methodology, the menu, the bussing style and the storage capacities.

COOK'S CHILL/ FREEZER

Space Characteristics

Function/adjacencies: Accommodates stocks of cold or frozen subsistence. See UFC 4-722-01, Appendix B for adjacencies.

Special Dimensions:
Ideal Plan Dimensions: See UFC 4-722-01, Appendix B
Minimum Ceiling Height: 10 ft. (3.05 m)

Acoustics:

Access: Staff

Number of Occupants: determined by staffing plan

Other/special requirements: Capacity is determined by analysis of the menu, the number of personnel to be served, and the defined delivery cycles. See UFC 4-722-01, Appendix B for additional information.

Uniformat Level 4#	Description	Qty	Size	Remarks
C101001	Fixed Partitions			Provide wall floor and ceiling construction as necessary to support the required temperature and storage volume.
C10	Interior construction			Provide a wire mesh partition between the exterior exit to the loading dock and the interior exit to the food preparation. This partition shall have a door that is lockable on the loading-dock side.
C10	Interior construction			Provide door safety handles.
C10	Interior construction			Refer to UFC 4-722-01 (Rev.) Chapter 3, Equipment, and Appendix B, Food Service Areas, for additional information.
C10	Walls			Finish by cooler manufacturer
C302001	Floor			Quarry tile with epoxy grout
C10	Ceiling			Finish by cooler manufacturer
E109002	Food Service Equipment			Provide equipment as necessary to support the required temperature and storage volume.
E109002	Food Service Equipment	SF		Provide Prefabricated walk-in Refrigerator/ Freezer.

FAST FOOD CHILL

Space Characteristics

Function/adjacencies: Storage of refrigerated prepared foods used for the fast food functions of this mess hall. Adjacent to fast food kitchen.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 10 ft. (3.05 m)

Acoustics:

Access: Staff

Number of Occupants:

Other/special requirements:

Uniformat Level 4#	Description	Qty	Size	Remarks
C101001	Fixed Partitions	SF		Provide wall floor and ceiling construction as necessary to support the required temperature and storage volume.
C102001	Steel Doors	EA	Varies	Steel Frames all doors
C102007	Interior Door Hardware	A/R		Hinges, kickplates, closers, Push/Pulls, Door Stops, Silencers.
C10	Ceiling			Finish by cooler manufacturer
C302001	Floor			Quarry tile with epoxy grout
D2090	Plumbing – Other			Provide systems per UFC 4-722-01 (Rev.) Chapter 3, Plumbing.
D40	Fire protection			Provide system per UFC 4-722-01 (Rev.) Chapter 3, Fire Protection and Life Safety.
D50	Electrical			Provide system per UFC 4-722-01 (Rev.) Chapter 3, Electrical.
E109002	Food Service Equipment			Provide equipment as necessary to accommodate the number of personnel to be served, the food delivery methodology, the menu, the bussing style and the storage capacities.
F102001	Special Purpose Rooms	SF		Prefabricated Metal insulated Jacketed Wall and Ceiling Panels

DAIRY CHILL

Space Characteristics

Function/adjacencies: Storage of dairy products. Convenient to beverage line.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 10 ft. (3.05 m)

Acoustics:

Access: Staff

Number of Occupants:

Other/special requirements:

Uniformat Level 4#	Description	Qty	Size	Remarks
C101001	Fixed Partitions	SF		Provide food prep counters and storage construction as necessary to accommodate the number of personnel to be served, the food delivery methodology, the menu, the bussing style and the storage capacities.
C102001	Steel Doors	EA	Varies	Steel Frames all doors
C102007	Interior Door Hardware	A/R		Hinges, kickplates, closers, Push/Pulls, Door Stops, Silencers.
C302001	Floor			Quarry tile with epoxy grout
D2090	Plumbing – Other			Provide systems per UFC 4-722-01 (Rev.) Chapter 3, Plumbing.
D40	Fire protection			Provide system per UFC 4-722-01 (Rev.) Chapter 3, Fire Protection and Life Safety.
D50	Electrical			Provide system per UFC 4-722-01 (Rev.) Chapter 3, Electrical.
E109002	Food Service Equipment			Provide equipment as necessary to accommodate the number of personnel to be served, the food delivery methodology, the menu, the bussing style and the storage capacities.
F109002	Food Service Equipment	SF		Provide Prefabricated Metal insulated Jacketed Wall and Ceiling Panels

VEGETABLE CHILL

Space Characteristics

Function/adjacencies: Storage of fresh vegetables. Adjacent to vegetable prep.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 10 ft. (3.05 m)

Acoustics:

Access: Staff

Number of Occupants:

Other/special requirements:

Uniformat Level 4#	Description	Qty	Size	Remarks
C101001	Fixed Partitions	SF		Provide food prep counters and storage construction as necessary to accommodate the number of personnel to be served, the food delivery methodology, the menu, the bussing style and the storage capacities.
C102001	Steel Doors	EA	Varies	Steel Frames all doors
C102007	Interior Door Hardware	A/R		Hinges, kickplates, closers, Push/Pulls, Door Stops, Silencers.
C302001	Floor			Quarry tile with epoxy grout
D40	Fire protection			Provide system per UFC 4-722-01 (Rev.) Chapter 3, Fire Protection and Life Safety.
D50	Electrical			Provide system per UFC 4-722-01 (Rev.) Chapter 3, Electrical.
E109002	Food Service Equipment			Provide equipment as necessary to accommodate the number of personnel to be served, the food delivery methodology, the menu, the bussing style and the storage capacities.
F109002	Food Service Equipment	SF		Provide Prefabricated Metal insulated Jacketed Wall and Ceiling Panels

SALAD ROOM CHILL

Space Characteristics

Function/adjacencies: Storage of fresh salad vegetables. Adjacent to vegetable prep.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 10 ft. (3.05 m)

Acoustics:

Access: Staff

Number of Occupants:

Other/special requirements:

Uniformat Level 4#	Description	Qty	Size	Remarks
C101001	Fixed Partitions	SF		Concrete Masonry Partitions
C102001	Steel Doors	EA	Varies	Steel Frames all doors
C102007	Interior Door Hardware	A/R		Hinges, kickplates, closers, Push/Pulls, Door Stops, Silencers.
C302001	Floor			Quarry tile with epoxy grout
D40	Fire protection			Provide system per UFC 4-722-01 (Rev.) Chapter 3, Fire Protection and Life Safety.
D50	Electrical			Provide system per UFC 4-722-01 (Rev.) Chapter 3, Electrical.
E109002	Food Service Equipment			Provide equipment as necessary to accommodate the number of personnel to be served, the food delivery methodology, the menu, the bussing style and the storage capacities.
F109002	Food Service Equipment	SF		Provide Prefabricated Metal insulated Jacketed Wall and Ceiling Panels

MEAT CHILL

Space Characteristics

Function/adjacencies: Storage of meat products

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 10 ft. (3.05 m)

Acoustics:

Access: Staff

Number of Occupants:

Other/special requirements:

Uniformat Level 4#	Description	Qty	Size	Remarks
C101001	Fixed Partitions	SF		Provide food prep counters and storage construction as necessary to accommodate the number of personnel to be served, the food delivery methodology, the menu, the bussing style and the storage capacities.
C102001	Steel Doors	EA	Varies	Steel Frames all doors
C102007	Interior Door Hardware	A/R		Hinges, kickplates, closers, Push/Pulls, Door Stops, Silencers.
C302001	Floor			Quarry tile with epoxy grout
D40	Fire protection			Provide system per UFC 4-722-01 (Rev.) Chapter 3, Fire Protection and Life Safety.
D50	Electrical			Provide system per UFC 4-722-01 (Rev.) Chapter 3, Electrical.
E109002	Food Service Equipment			Provide equipment as necessary to accommodate the number of personnel to be served, the food delivery methodology, the menu, the bussing style and the storage capacities.
F109002	Food Service Equipment	SF		Provide Prefabricated Metal insulated Jacketed Wall and Ceiling Panels

FAST FOOD FREEZER

Space Characteristics

Function/adjacencies: Storage of frozen food. Convenient to fast food kitchen. Adjacent to food prep. areas.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 10 ft. (3.05 m)

Acoustics:

Access: Staff

Number of Occupants:

Other/special requirements:

Uniformat Level 4#	Description	Qty	Size	Remarks
C101001	Fixed Partitions	SF		Provide food prep counters and storage construction as necessary to accommodate the number of personnel to be served, the food delivery methodology, the menu, the bussing style and the storage capacities.
C102001	Steel Doors	EA	Varies	Steel Frames all doors
C102007	Interior Door Hardware	A/R		Hinges, kickplates, closers, Push/Pulls, Door Stops, Silencers.
C302001	Floor			Quarry tile with epoxy grout
D40	Fire protection			Provide system per UFC 4-722-01 (Rev.) Chapter 3, Fire Protection and Life Safety.
D50	Electrical			Provide system per UFC 4-722-01 (Rev.) Chapter 3, Electrical.
E109002	Food Service Equipment			Provide equipment as necessary to accommodate the number of personnel to be served, the food delivery methodology, the menu, the bussing style and the storage capacities.
F109002	Food Service Equipment	SF		Provide Prefabricated Metal insulated Jacketed Wall and Ceiling Panels

MEAT FREEZER

Space Characteristics

Function/adjacencies: Storage of frozen food. Convenient to fast food kitchen. Adjacent to food prep. areas.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 10 ft. (3.05 m)

Acoustics:

Access: Staff

Number of Occupants:

Other/special requirements:

Uniformat Level 4#	Description	Qty	Size	Remarks
C101001	Fixed Partitions	SF		Provide food prep counters and storage construction as necessary to accommodate the number of personnel to be served, the food delivery methodology, the menu, the bussing style and the storage capacities.
C102001	Steel Doors	EA	Varies	Steel Frames all doors
C102007	Interior Door Hardware	A/R		Hinges, kickplates, closers, Push/Pulls, Door Stops, Silencers.
C302001	Floor			Quarry tile with epoxy grout
D40	Fire protection			Provide system per UFC 4-722-01 (Rev.) Chapter 3, Fire Protection and Life Safety.
D50	Electrical			Provide system per UFC 4-722-01 (Rev.) Chapter 3, Electrical.
E109002	Food Service Equipment			Provide equipment as necessary to accommodate the number of personnel to be served, the food delivery methodology, the menu, the bussing style and the storage capacities.
F109002	Food Service Equipment	SF		Provide Prefabricated Metal insulated Jacketed Wall and Ceiling Panels

DRY STORAGE

Space Characteristics

Function/adjacencies: Accommodates stocks of subsistence (consumables). Adjacent to kitchen. Convenient to fast food kitchen and food preparation areas.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 10 ft. (3.05 m)

Acoustics:

Access: Staff

Number of Occupants: determined by staffing plan

Other/special requirements: Determined by the number of personnel to be served, the food delivery methodology, the menu, the bussing style and required storage capacities. Room must be well ventilated. Provide built-in shelving and storage units as required by activity

Uniformat Level 4#	Description	Qty	Size	Remarks
C101001	Fixed Partitions	SF		Concrete Masonry Partitions
C102001	Standard Interior Doors			Provide a wire mesh partition between the exterior exit to the loading dock and the interior exit to the food preparation. This partition shall have a door that is lockable on the loading-dock side.
C102007	Interior Door Hardware	A/R		Hinges, Kickplates, Closers, Push/Pulls, Door Stops, Silencers
C301005	Wall Paint			
C301090	Corner Guards			Stainless
C302001	Floor		12”x12’ min	Quarry Tile with epoxy grout
C302001	Tile Base			Quarry tile Match flooring
C303003	Ceiling			Veneer Plaster painted
E109002	Food Service Equipment	A/R		NSF Storage Shelf Units

NON-FOOD STORAGE

Space Characteristics

Function/adjacencies: Accommodates stocks of nonsubsistence items, e.g., tableware, paper goods, and cleaning supplies. Adjacent to kitchen. Convenient to fast food kitchen and food preparation areas.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 10 ft. (3.05 m)

Acoustics:

Access: Staff

Number of Occupants: determined by staffing plan

Other/special requirements: Determined by the number of personnel to be served, the food delivery methodology, the menu, the bussing style and required storage capacities. Room must be well ventilated Provide built-in shelving and storage units as required.

Uniformat Level 4#	Description	Qty	Size	Remarks
C101001	Fixed Partitions	SF		CMU
C102001	Standard Interior Doors	EA	Varies	Provide a wire mesh partition between the exterior exit to the loading dock and the interior exit to the food preparation. This partition shall have a door that is lockable on the loading-dock side.
C102007	Interior Door Hardware	A/R		Hinges, Kickplates, Closers, Push/Pulls, Door Stops, Silencers
C304001	Walls			Painted Epoxy
C301090	Corner Guards			Stainless
C302001	Floor		12”x12’ min	Quarry Tile with epoxy grout
C302001	Tile Base			Quarry tile Match flooring
C303003	Ceiling			Veneer Plaster painted
E109002	Food Service Equipment	A/R		NSF Storage Shelf Units

BEVERAGE/BREAD STORAGE

Space Characteristics

Function/adjacencies: Accommodates storage of carbonated beverages. Adjacent to kitchen.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 10 ft. (3.05 m)

Acoustics:

Access: Staff

Number of Occupants: determined by staffing plan

Other/special requirements: Determined by the number of personnel to be served, the food delivery methodology, the menu, the bussing style and required storage capacities Provide built-in shelving and storage units as required.

Uniformat Level 4#	Description	Qty	Size	Remarks
C101001	Fixed Partitions	SF		CMU
C102001	Standard Interior Doors	EA		Provide a wire mesh partition between the exterior exit to the loading dock and the interior exit to the food preparation. This partition shall have a door that is lockable on the loading-dock side.
C102007	Interior Door Hardware	A/R		Hinges, Kickplates, Closers, Push/Pulls, Door Stops, Silencers
C304001	Walls			Paint
C301090	Corner Guards			Stainless
C302001	Floor		12”x12’ min	Quarry Tile with epoxy grout
C302001	Tile Base			Quarry tile Match flooring
C303003	Ceiling			Veneer Plaster painted
E109002	Food Service Equipment	A/R		NSF Storage Shelf Units

OFFICES

Space Characteristics

Function/adjacencies: Accommodates staff administrative functions

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 8 ft. (2.43 m)

Acoustics: 45 STC. Extend partition to underside of structure above.

Access: Staff

Number of Occupants:

Other/special requirements:

Uniformat Level 4#	Description	Qty	Size	Remarks
B202001	Windows	SF		
B202004	Exterior Glazing	SF		Low ‘E’ glazing or spectral glazing
C101001	Fixed Partitions	SF		
C101005	Interior Windows	SF		See UFC for interior views
C101007	Interior Glazing	SF		
C102001	Standard Interior Doors	EA		
C102007	Interior Door Hardware	A/R		Lever type hardware for ADA compliance
C304001	Walls			Painted
C302001	Floor		12”x12’ min	Quarry Tile with epoxy grout
C302001	Tile Base			Quarry tile Match flooring
C303001	Acoustical Ceiling Panels		24”x24”	Suspended acoustic ceiling materials. revel edge
C303005	Suspension Systems			Exposed Suspended Acoustical Ceiling Grid
E102009	Equipment			Provide office equipment as necessary to accommodate the staffing plan.
E102009	Equipment			Provide a three-tumbler cashier’s safe containing individual combination-locked compartments for each cashier plus one case collection agent.

STAFF TOILETS

Space Characteristics

Function/adjacencies: Staff use, ADA facilities. Convenient to staff entrance and adjacent to staff lockers/ showers.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 8 ft. (2.43 m)

Acoustics:

Access: Staff

Number of Occupants: based on staffing plan

Other/special requirements:

Uniformat Level 4#	Description	Qty	Size	Remarks
C101001	Fixed Partitions			Provide counters, toilet and urinal partitions, and toilet accessories as necessary to accommodate the staffing plan.
C102001	Standard Interior Doors	EA	varies	Steel frames all doors
C102007	Interior Door Hardware	A/R		Hinges, Kickplates, Closers, Push/Pulls, Door Stops, Silencers
C103002	Compartments, Cubicles and Toilet Partitions	A/R		ADA compliant, Solid Plastic or Phenolic
C103002	Toilet and Bath Accessories	A/R		Toilet Tissue Dispensers, Combination Paper Towel Dispenser/Disposal, Grab Bars, Robe Hooks, Mirror, Soap Dispensers.
C103006	Counters	LF		Solid Surface Material - Provide 4” high solid-surface back and side splash along countertop perimeter.
C301004	Walls			Ceramic tile 4x4 up to 72” AFF paint above
C302001	Floor		Min 12”x12”	Porcelain tile.
C304001	Wall paint			Paint wall and ceiling
C302001	Wall Base			Porcelain Tile base to match floor
C303002	Ceiling			Moisture resistant GWB
D201001	Water Closets	A/R		Floor mounted flush valve type water closets
D201002	Urinals	A/R		
D201003	Lavatories	A/R		Solid surface integral to counter top
D304007	Exhaust Systems	A/R		
D502002	Lighting Equipment			Provide residential feel lighting over vanity area.

STAFF LOCKERS/SHOWERS

Space Characteristics

Function/adjacencies: Separate male and female facilities for showering, changing, and storage of personal effects for staff. Convenient to staff entrance.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 8 ft. (2.43 m)

Acoustics:

Access: Staff

Number of Occupants: determined by the staffing plan

Other/special requirements:

Uniformat Level 4#	Description	Qty	Size	Remarks
C101001	Fixed Partitions	SF		
C102001	Standard Interior Doors	EA	Varies	Solid core, natural stain finish, all interior doors.
C102007	Interior Door Hardware	A/R		Hinges, Kickplates, Closers, Push/Pulls, Door Stops, Silencers.
C103001	Compartments, Cubicles and Toilet Partitions	A/R		ADA compliant, Solid Plastic or Phenolic
C103002	Toilet and Bath Accessories	A/R		Double Toilet Tissue Dispensers, Combination Paper Towel Dispenser/Disposer, Grab Bars, Robe Hooks, Mirror at sink and Full length mirror, Soap Dispensers.
C103005	Lockers	Provide quantity per UFC 4-722-01 (rev), Appendix B, Staff Facilities		Provide three-tiered lockers with sloped tops.
C103008	Counters	LF		Solid Surface Material - Provide 4” high solid-surface back and side splash along countertop perimeter.
C303002	Walls			Ceramic tile 4x4 up to 72” AFF Paint above
C302001	Floor		Min 12”x12”	Porcelain tile.
C304001	Wall paint			Paint wall and ceiling
C302001	Wall Base			Porcelain Tile base to match floor
C303002	Ceiling			Moisture resistant GWB
D201005	Showers/ Tubs	A/R		Provide shower fixtures as necessary to accommodate the staffing plan. Shower to be Soild Surface with porcelain tile shower pan
D304007	Exhaust Systems	A/R		
E201001	Furnishings			Bench seating.

JANITOR'S CLOSET

Space Characteristics

Function/adjacencies: Provides storage for cleaning supplies and a mop sink. One convenient to dining; One convenient to kitchen/ food preparation areas.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 8 ft. (2.43 m)

Acoustics:

Access: Staff

Number of Occupants:

Other/special requirements: Built-in shelving. (min 6, 36' wide)

Uniformat Level 4#	Description	Qty	Size	Remarks
C101001	Fixed Partitions	SF		CMU
C102001	Standard Interior Doors	EA	Varies	Solid core, natural stain finish, all interior doors
C102007	Interior Door hardware	A/R		Hinges, Kickplates, Closers, Push/Pulls, Door Stops, Silencers
C304001	Walls			Paint Epoxy
C302001	Floor			Quarry tile
C302001	Wall Base			Quarry tile
C303002	Ceiling			Moisture resistant GWB
D2010	Plumbing			Provide a service sink.

CAN WASH

Space Characteristics

Function/adjacencies: Provides high-temperature water supply near the loading dock for can cleaning.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 10 ft. (3.05 m)

Acoustics:

Access: Staff

Number of Occupants: N/A

Other/special requirements:

Uniformat Level 4#	Description	Qty	Size	Remarks
B203001	Solid Doors	EA	Varies	
C101001	Fixed Partitions	SF		CMU
C102007	Interior Door hardware	A/R		Hinges, Kickplates, Closers, Push/Pulls, Door Stops, Silencers
C304001	Walls			CMU Paint Epoxy
C302001	Floor			Quarry tile
C301090	Corner Guards			Stainless
C302001	Wall Base			Quarry tile
C303002	Ceiling			Moisture resistant GWB
D20	Plumbing			Provide high-temperature water supply and floor drain.

LOADING DOCK

Space Characteristics

Function/adjacencies: The loading dock accommodates material transfer in and out of the facility. It shall be directly adjacent to the exterior entrances to the storage spaces per UFC 4-722-01 (Rev.) Chapter 3, Equipment, and Appendix B, Food Service Areas.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 10 ft. (3.05 m)

Acoustics:

Access: Staff

Number of Occupants: N/A

Other/special requirements: Provide separate pathways to/from the loading dock for food delivery and trash removal.

Uniformat Level 4#	Description	Qty	Size	Remarks
B203001	Solid Doors	EA	Varies	
C302001	Floor			Sealed concrete
E103002	Loading Dock Equipment	EA		Provide dock levelers a ramp to connect the dock to the parking level. Provide cart stops at edge of dock. Provide bumpers at the dock edge. Provide a canopy that extends 48 in. (1220 mm) beyond the edge of the dock. Coordinate equipment and canopy height with delivery truck height.
E109002	Food Service Equipment	A/R		Exterior storage freezers

TANK ROOM

Space Characteristics

Function/adjacencies: Area for the storage of CO2 bottles. Located near loading dock.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 10 ft. (3.05 m)

Acoustics:

Access: Staff

Number of Occupants: N/A

Other/special requirements:

Uniformat Level 4#	Description	Qty	Size	Remarks
B203001	Solid Doors	EA	Varies	
C302001	Floor			Sealed concrete
C302001	Wall Base			Rubber base

EXTRACTOR

Space Characteristics

Function/adjacencies: Area for food disposal. Convenient to loading dock.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 10 ft. (3.05 m)

Acoustics:

Access: Staff

Number of Occupants: N/A

Other/special requirements:

Uniformat Level 4#	Description	Qty	Size	Remarks
B203001	Solid Doors	EA	Varies	
C302001	Floor			Sealed concrete
C302001	Wall Base			Rubber base
E109002	Food Service Equipment	A/R		Extractor system tied to pulpers.

RECYCLE ROOM

Space Characteristics

Function/adjacencies: Provides area for recycling near the loading dock.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 10 ft. (3.05 m)

Acoustics:

Access: Staff

Number of Occupants: N/A

Other/special requirements:

Uniformat Level 4#	Description	Qty	Size	Remarks
B203001	Solid Doors	EA	Varies	
C101001	Fixed Partitions	SF		CMU
C102007	Interior Door hardware	A/R		Hinges, Kickplates, Closers, Push/Pulls, Door Stops, Silencers
C304001	Walls			Paint Epoxy
C301090	Corner Guards			Stainless
C302001	Floor			Quarry tile
C302001	Wall Base			Quarry tile
C303001	Acoustical Ceiling Panels			Moisture resistant Suspended acoustic ceiling materials.
C303005	Suspension Systems			Exposed Suspended Acoustical Ceiling Grid

MECHANICAL/ ELECTRICAL/ COMMUNICATIONS

Space Characteristics

Function/adjacencies: Space to house mechanical, electrical and telephone equipment.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 10 ft. (3.05 m)

Acoustics: 50 STC. Extend partitions to roof structure

Access: Staff

Number of Occupants: N/A

Other/special requirements: Mechanical room does not require a ceiling. Exterior access required for mechanical and electrical rooms. Telephone/ communication equipment room to have an interior access.

Uniformat Level 4#	Description	Qty	Size	Remarks
B203002	Solid Doors	A/R		Thermally insulated
B203008	Exterior Door Hardware	A/R		Fully weather-stripped, heavy-duty metal threshold, lockset, hinges, door stops and silencers.
C101001	Fixed Partitions	SF		CMU
C102001	Steel Doors	EA	Varies	Steel Frames all doors
C102007	Interior Door Hardware	A/R		Hinges, kickplates, closers, Push/Pulls, Door Stops, Silencers.
C302001	Floor			Quarry tile
C302001	Wall base			Quarry tile
C304001	Painting			Paint Epoxy
D40	Fire protection			Provide system per UFC 4-722-01 (Rev.) Chapter 3, Fire Protection and Life Safety.
D50	Electrical			Provide system per UFC 4-722-01 (Rev.) Chapter 3, Electrical.

FIELD FEEDING GEAR ROOM

Space Characteristics

Function/adjacencies: Provides storage for field feeding

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 10 ft. (3.05 m)

Acoustics:

Access: Staff

Number of Occupants: N/A

Other/special requirements:

Uniformat Level 4#	Description	Qty	Size	Remarks
B203001	Solid Doors	EA	Varies	
C101001	Fixed Partitions	SF		CMU
C102007	Interior Door hardware	A/R		Hinges, Kickplates, Closers, Push/Pulls, Door Stops, Silencers
C304001	Walls			Paint Epoxy.
C302010	Hardened and Sealed Concrete Floors			Acid resistant sealed concrete.
C303001	Acoustical Ceiling Panels			Moisture resistant Suspended acoustic ceiling materials.
C302001	Wall Base			Rubber base
C303005	Suspension Systems			Exposed Suspended Acoustical Ceiling Grid

6. ENGINEERING SYSTEMS REQUIREMENTS

A10 FOUNDATIONS

SYSTEM DESCRIPTION

Provide the building foundation system in accordance with UFC 3-301-01, *Structural Engineering*. Foundation shall be designed to suit subsurface conditions, and shall be capable of transmitting all building loads to the ground.

A10 GENERAL

The Contractor shall commission the services of a geotechnical engineer registered as a Professional Engineer and experienced with the soils in the Geographic region of the project.

Subsurface soil information, including a geotechnical report, is included in other portions of this RFP.

Engage a registered Professional Engineer to provide inspection of excavations and soil/groundwater conditions throughout construction.

A1010 STANDARD FOUNDATIONS

See "System Description" above. The foundation construction may include any foundation system meeting the requirements of this section. Do not use timber footings or wood foundations.

A1020 SPECIAL FOUNDATIONS

The actual foundation type, capacity, etc. will be determined after contract award by the Contractor's structural and geotechnical engineers based on the actual loads and available geotechnical data. The seismic requirements are specified herein. The contractor shall bear all costs of the actual foundation provided, except under circumstances where adjustments in contract award price may be made under the provisions of Contract Clause FAR 52.236-2, "Differing Site Conditions."

A1030 SLAB ON GRADE

Provide either a standard or structurally supported concrete slab on grade. Where slab on grade is below the existing adjacent exterior grade, provide a perimeter drainage system to remove ground water from the area immediately adjacent to the buildings. Provide perimeter insulation. When providing a structurally supported slab, provide for support of all under slab utilities. Slab on grade shall comply with settlement limits provided in EM 1110-1-1904 and shall not create a tripping hazard or interfere with the function of interior or exterior doors.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

A20 BASEMENT CONSTRUCTION

SYSTEM DESCRIPTION

Provide the basement construction in accordance with UFC 3-301-01, *Structural Engineering*.

A2010 BASEMENT EXCAVATION

A2020 BASEMENT WALLS

Basement walls include exterior walls below the ground floor level of the building, including walls that are below grade, elevator pits and other pits. Provide basement walls constructed of cast-in-place concrete. Provide waterproofing of basement walls.

--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*.

In addition, design the structure in accordance with the following loading criteria:

Importance Factors

Use Occupancy Category III in Table 2-2 of UFC 3-301-01 for determining Importance Factors for seismic, snow, and wind design.

Wind Exposure

Wind design shall be based on Exposure C.

A site specific seismic ground motion study is not required.

B1010 FLOOR CONSTRUCTION

The floor construction shall be cast-in-place concrete slabs on removable forms, or precast concrete slabs. The floor deck shall be supported on cast-in place concrete walls.

B1020 ROOF CONSTRUCTION

The roof construction may include steel roof deck on steel joists, steel roof deck on steel beams, or steel roof deck on light-gage metal framing.

--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*). Load bearing exterior walls will be included 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*.

GENERAL SYSTEMS REQUIREMENTS

B2010 EXTERIOR WALLS

The primary exterior material of the building shall be brick masonry to match existing adjacent structures on the base.

A split face CMU water table shall be provided to match existing adjacent structures.

Waterproofing, thermal, vapor and air barrier systems shall be designed in consideration of the project's regional and specific microclimate as well as conditions that may be created by the specific physical building design.

Except where otherwise specified, provide insulated, cavity wall-type masonry construction for all exterior walls. Provide complete with flashing, weeps, closures and other components as necessary for watertight construction.

B201001 EXTERIOR CLOSURE

Provide brick exterior wall closure.

B201002 EXTERIOR WALL BACKUP CONSTRUCTION

Provide Exterior Wall Construction System (back-up systems for wall veneer) including cast-in-place concrete, pre-cast concrete, unit masonry, and metal framed wall systems with insulation as described below:

Exterior bearing walls consisting of metal studs as the primary floor or roof supporting structural element are not permitted.

B201003 INSULATION, VAPOR RETARDER, and AIR BARRIER

Provide insulation to meet the energy savings requirements.

Provide a continuous air barrier to control air leakage into, or out of, conditioned spaces. The building

envelope shall including 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 tests in RFP Part 4.

Insulation shall be provided for all exterior enclosures and shall meet, at minimum, the requirements of ASHRAE 90.1 for building envelope, and as required to attain the identified USGBC LEED credit for certification.

B201004 PARAPETS

Provide parapets for exterior wall construction, where required for low-slope roofs.

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.

B201007 EXTERIOR SOFFITS

Provide exterior soffit system metal.

B201009 EXTERIOR PAINTING AND COATINGS

All exterior surfaces shall be prefinished.

B201010 EXTERIOR JOINT SEALANTS

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

B201011 SUN CONTROL DEVICES (EXTERIOR)

Sun control devices shall be detailed to integrate with the architectural wall system, window design and roof overhangs.

B201012 SCREEN WALL

Provide masonry wall with brick veneer screen walls where required to screen mechanical units, electrical substations, loading docks, and trash receptacles. Screen walls shall be compatible with the building architecture. Rooftop mechanical screens shall be designed to minimize roofing penetrations.

B2020 EXTERIOR WINDOWS

As much as practical, windows shall be provided in each area of the building that is regularly occupied, to enhance the working environment, without compromising visual acuity and comfort. Natural day-lighting is preferred, except at the storage areas. Exterior windows shall be prefinished aluminum. Windows shall meet UFC 4-010-01 Antiterrorism requirements.

All exterior windows will be laminated glass in accordance with UFC 4-010-01 Standard 10 and ASTM Standard E1300-04, Standard Practice for Determining Load Resistance of Glass in Buildings, ASTM Standard F1642-04, Standard Test Method for Glazing and Glazing Systems Subject to Airblast Loadings, ASTM Standard F2248-03, Standard Practice for Specifying an Equivalent 3-Second Duration Design Loading for Blast Resistant Glazing Fabricated with Laminated Glass; with slight modifications made necessary by conservatism in ASTM E1300-04 and F2248-03.

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, the sample window shall be installed in the masonry sample panel.

B202001 WINDOWS

The new mess hall at MCB Camp Lejeune is to be designed to satisfy Anti-Terrorism and Force Protection (ATFP) standoff distances and explosive design pressures per UFC 4-010-01; DoD Minimum Antiterrorism Standards for Buildings, a basic wind speed per UFC 3-301-01; Structural Engineering, and include impact resistant windows to resist wind-borne debris per the requirements of ASTM E1886 – Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials and E1996-09 – Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes. All windows, attachments, and local-supporting members will be designed to resist the worst of the first two requirements (as applicable), but not less than the third.

Determine the construction of security windows by evaluating the project program security requirements, using the Mil Hdbk. 1013/1A, *Design Guidance for Physical Security of Facilities* UFC 4-024-10, *Security Engineering to Resist Forced Entry*, to define window requirements.

Windows shall be operable or fixed. Operable windows shall be provided with an integral insect screen.

Provide a mockup of one combination window unit for the project to be used for a field mockup test of compliance with AAMA 502 Method A and Method B

B202002 STOREFRONTS

Storefronts shall be aluminum. Glazing shall match windows.

B202004 EXTERIOR GLAZING

Glazing color shall be clear low-e.

Glazing shall be clear low-e insulating glass units.

B202090 OTHER EXTERIOR WINDOWS

Provide pass windows at fast food drive thru location.

B2030 EXTERIOR DOORS

Provide solid door assemblies other than at the main entrance. Exterior doors and frames shall be non-corroding prefinished galvanized steel, prefinished stainless steel.

Doors shall be Extra Heavy Duty Doors -– ANSI /SDI A250.8, Level 3, physical performance Level A, Model 1.

Glazing shall match the window glazing.

B203001 SOLID DOORS

Provide solid steel door assemblies other than at main storefront/curtainwall entrances including prefinished galvanized heavy-duty, non-corroding, insulated doors with frames and hardware. Also provide louvers and accessories and wall opening elements such as lintels sills and flashings.

Provide impact resistant, hard plastic, doors with windows between galley and serving lines.

B203002 GLAZED DOORS

Glazed Doors - Provide Exterior Glazed Doors and Entrances System. Including factory-finish aluminum framed door assemblies with insulated, glazing, frames, and hardware compatible with other buildings on the base and wall opening elements such as lintels, sills, through-wall flashings, and joint sealers.

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. Replacement interchangeable cores shall be compatible with the Best Lock system.

Door hardware finish shall be stainless steel.

B203090 OTHER EXTERIOR SPECIALTY DOORS

Provide automatic swinging entrance doors at the main entrance to the building.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

B30 ROOFING

B30 GENERAL SYSTEM DESCRIPTION

Roof systems shall be watertight and 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 shall include the roof plan, method of drainage, standard details and details unique to the project, wind load calculations and requirements.

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

Refer to UFC 3-110-03, *Roofing*, and UFC 3-100-10N, *Architecture*, for additional roofing requirements.

B3010 ROOF COVERINGS

B301001 STEEP SLOPE ROOFING SYSTEMS

Steep slope roofing systems are preferred over low slope roofing systems, where practical. Steep slope roofing systems that are acceptable include metal standing seam 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.

SSSMRS Warranty Certificate. At the completion of the project the Contractor shall furnish signed copies of the 5-year Warranty for Structural Standing Seam Metal Roof (SSSMR) System, a sample copy of which is attached to the PTS section, and the 20-year Manufacturer's Material Warranties, and the manufacturer's 20-year system weather-tightness warranty.

Specular Gloss of Finished roof surfaces shall have a specular gloss value of 30 plus or minus 5 at 60 degrees when measured in accordance with ASTM D 523.

B301002 LOW SLOPE ROOFING SYSTEMS

A relatively small percentage of the total building roof will be allowed to be low slope for the mounting of exhaust equipment over the kitchen/utensil wash areas of the facility; other above-ceiling HVAC equipment shall be on a mezzanine in attic space. Interior roof drains shall be prohibited – provide gutter or scuppers and downspouts.

Wind Uplift - The complete roof covering assembly shall be rated Class 1- 60,75,90,105,120,135 or appropriate in accordance with FM P7825, capable of withstanding an uplift pressure of 90 pounds per square foot with a safety factor of 2, and FM I-49 for perimeter and flashing attachment.

Fire Safety - Complete roof covering assembly shall:

1. Be Class A rated in accordance with ASTM E 108 or FM 4470 or UL 790; and

2. Be listed as [part of Fire-Classified roof deck construction in UL RMSD or Class I roof deck construction in FM P7825c.

A three ply modified system consisting of modified base sheet, modified bitumen interply sheet, and modified bitumen cap sheet is the system of choice for new low sloped roofing.

Provide polyester reinforced cap sheet on Modified Bitumen roofs expected to experience high levels of traffic, on roofs with congested equipment, where equipment is expected to receive regular service or high maintenance, and where other service conditions warrant.

B301003 ROOF INSULATION AND FILL

For fastening roof insulation on low-slope membrane roofs, fasteners shall be place to withstand and obtain an uplift pressure of 90 pounds per square foot (with a safety factor of 2) in the field of the roof and FM LPDS 1-49 for perimeter component and flashing attachment.

B301004 FLASHINGS AND TRIM

Flashing and sheet metal work shall include scuppers, splash pans, and sheet metal roofing. Flashings shall be Steel Sheet, Zinc-Coated (Galvanized) - ASTM A 653/ A 653M. Galvanized steel items shall have a baked-on, factory applied finish of polyvinylidene fluoride or an equivalent fluorocarbon coating. Aluminum Alloy Sheet and Plate - ASTM B 209 Pre-Finished Aluminum. Finish shall 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.

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 insulated roof hatch and rails or guards.

B301090 OTHER ROOFING

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

--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 to the buildings use as a Dining Facility. Acoustic properties of materials, as well as durability, shall be considered during material selection.

GENERAL SYSTEMS REQUIREMENTS

The Project is subject to abuse and requires that "impact Resistant" systems be provided. See "Room Requirements" for specific requirements on “Partitions”, "Interior Doors", and "Fittings".

C1010 PARTITIONS

All interior partitions shall be either concrete masonry or metal studs with gypsum board each side.

C101001 FIXED PARTITIONS

Provide fixed interior partitions, except where demountable or retractable partitions are specifically required by the "Room Requirements." Sound-rated partition assemblies shall have a minimum Sound Transmission Coefficient (STC) of 45 in accordance with ASTM E 90 or ASTM E 413 for frequency data.

Glass masonry units shall transmit 75 percent light.

C101004 INTERIOR GUARDRAILS AND SCREENS

Provide balustrades where required by code. Provide screens where required to prohibit view of a particular area.

C101005 INTERIOR WINDOWS

Provide interior windows of hollow metal, fixed.

Bullet-resistant windows shall meet U.L. Classification, as required for the installation. Each window shall be a complete factory-assembled unit with glass factory or field installed.

C101006 GLAZED PARTITIONS & STOREFRONTS

Provide glazed storefront system.

C101007 INTERIOR GLAZING

Interior glazing shall be clear tempered glass as required.

C1020 INTERIOR DOORS

C102001 STANDARD INTERIOR DOORS

All interior doors shall be flush.

All interior doors shall be hollow metal in hollow metal frames.

Flush wood doors shall be WDMA I.S.1A-04, premium, heavy duty or otherwise as required by the project program. Flush wood doors shall be WDMA I.S.-97 PC-5 5-ply particleboard core or SCLC-5 5-ply structural composite lumber core.

Veneer for flush doors shall be Select White Birch in veneer match.

Doors shall have Factory Finish of AWI Quality Standards Section 1500, specification for catalyzed polyurethane.

Provide high impact plastic doors with bumper guards between serving lines and kitchen.

C102002 GLAZED INTERIOR DOORS

Provide vision glazing in doors where it is required by the “Room Requirements” portion of this RFP, or it is deemed advantageous to be able to see through the door, either for safety of pedestrian traffic, or other functional reason.

C102003 FIRE DOORS

This paragraph covers all interior fire doors, including all necessary frames, hardware, closing devices, and alarms associated with the door.

Provide interior fire doors as required.

Doors shall conform with NFPA 80 and NFPA 105. Fire doors and frames shall bear the label of UL, FM or WHI attesting to the rating required. Door and frame assemblies shall be tested for conformance per NFPA 252 or UL 10B (for neutral pressure) or UL 10C (for positive pressure). Wood fired doors shall 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.

C102005 INTERIOR OVERHEAD DOORS

Provide interior overhead doors as required.

C102006 INTERIOR GATES

Provide interior gates.

C102007 INTERIOR DOOR HARDWARE

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.

Door hardware finish shall be chrome-plated brass or bronze, or stainless steel.

Door hardware shall be compatible with the Best Lock System removal core system.

C102090 OTHER INTERIOR SPECIALTY DOORS

Provide interior specialty doors. Provide Bi-swinging doors in kitchen/ serving areas.

C102091 OTHER INTERIOR PERSONNEL DOORS

Provide interior personnel doors.

C1030 SPECIALTIES

C103001 COMPARTMENTS, CUBICLES, & TOILET PARTITIONS

Provide solid plastic, phenolic core toilet partitions in all toilet rooms with more than one water closet or urinal. Provide toilet accessories as indicated in Chapter 3, “Room Requirements” portion of this RFP.

C103002 TOILET AND BATH ACCESSORIES

Provide toilet and bath accessories.

C103003 MARKER BOARDS AND TACK BOARDS

Provide marker boards and tack boards as indicated in Chapter 5 "Room Requirements" portion of this RFP. Marker boards and tack boards are funded as part of the construction contract.

C103004 IDENTIFYING DEVICES

All necessary interior signage shall be incorporated as part of the architectural drawings. Interior signage is not collateral equipment. Interior signage shall demonstrate complete coordination with the facility 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 ADA requirements.

C103005 LOCKERS

Provide lockers. Lockers shall be metal construction and enamel finish. Lockers are funded as part of the construction contract.

C103006 SHELVING

Provide steel utility shelving.

C103007 FIRE EXTINGUISHER CABINETS

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

C103008 COUNTERS

Provide stainless steel counter tops and back splashes in kitchen areas. Provide solid surface material in serving areas.

C103009 CABINETS

Provide cabinetry and millwork items with associated accessories. Cabinetry shall be AWI custom grade and have concealed hinges with adjustable standards for shelves. All exposed surfaces will be covered with high pressure plastic laminate clad.

Provide specific cabinetry as shown on the Room Requirements Sheets.

C103010 CASEWORK

Provide specific casework as shown on the Room Requirements Sheets. .

C103012 FIRESTOPPING PENETRATIONS

Provide all sleeves, caulking, and flashing for fire-stopping penetrations.

C103014 ENTRANCE FLOOR GRILLES AND MATS

Provide recessed pan floor mats at main building entrances.

C103090 OTHER INTERIOR SPECIALTIES

Provide wall or above ceiling mounted television sets as approved by client.

Provide fully articulating- universal wall mount and blocking as required for TV’s (provided in FF&E)

Contractor to coordinate blocking and mount with electrical and cable connections.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

C20 STAIRS

SYSTEM DESCRIPTION

Stairs, including stair construction and stair finishes, shall be provided as required by the building code to provide egress from the building from above or below grade level floors. Stairs shall be in accordance with UFC 1-200-01, *General Building Requirements*.

GENERAL SYSTEMS REQUIREMENTS

C2010 STAIR CONSTRUCTION

C201001 INTERIOR AND EXTERIOR STAIRS

Interior stairs shall be constructed of steel.

Exterior stairs shall be constructed of galvanized steel or cast-in-place reinforced concrete.

Concrete is an acceptable finish for exterior stairs. Exterior concrete stairs shall have cast aluminum treads with abrasive surface.

Steel stairs shall be primed and painted.

C201090 HANDRAILS, GUARDRAILS, AND ACCESSORIES

Handrails and guardrails shall be galvanized steel, prefinished aluminum, or prefinished steel. Handrails and guardrails shall present a smooth, unbroken surface throughout the length of the stair.

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

Metal ladders and railings complying with OSHA requirements shall be provided for access and protection to any mechanical mezzanines, lofts or other similar spaces.

--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 building's function as a dining facility. Acoustic properties of materials, as well as durability and ease of maintenance, shall be considered during material selection. Maximize the use of sustainable materials.

Color and material selections require the use of wall and floor finish material accents to enhance the color and appearance of the interior design. Provide wall and floor color designs that includes a minimum of two different accents colors throughout the facility. Submit pattern drawings of the accents design with the interior design submittal.

GENERAL SYSTEMS REQUIREMENTS

See "Room Requirements" for specific requirements on "Interior Finishes."

Adherence to the following design criteria is critical:

UFC 3-120-10 (1 JUL 2007) DESIGN: GENERAL INTERIOR DESIGN REQUIREMENTS

UFC 4-722-01 (2 JULY 2007) DINING FACILITIES

C30 SSPC QP 1 CERTIFICATION

The Project requires industrial coatings on exposed surfaces. All contractors and subcontractors that perform field applied surface preparation or coating application shall 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 shall remain certified while accomplishing any surface preparation or coating application.

C3010 WALL FINISHES

Provide porcelain (medium grade) 6" min wainscot in all toilet rooms to a height of 48" AFF . Provide accent tile, accent strips or other patterned design and accessory porcelain tile shapes as an integral part of the porcelain wall tile system.

Provide porcelain tile wainscot with porcelain and ceramic accent tiles to a height of 48" AFF in Queue areas.

Provide porcelain tile wainscot with porcelain and/or ceramic accent tiles to a full height in all serving areas.

Provide epoxy grout in all areas.

At a minimum, provide manufacturer's full range of colors and styles. Tile shall be a minimum of two grades above base grade.

Solid surfacing wall finishes shall extend from top of shower pan to 84” and shall surround the shower enclosures.

Provide full and adequate protection systems for interior finishes. Commercial, premium grade, stainless steel corner guardsshall be used on all outside corners, up to 48” AFF as appropriate. Provide floor-mounted doorstops for all interior doors that do not have automatic closure mechanisms with travel limit adjustment. Provide door push plates and base kick plates as appropriate for the interior use and of the proper finish.

All interior wall finish materials shall be as indicated in the Room Requirements portion of this RFP.

Mirror wall (one uninterrupted short wall), in shower area, shall be 28 inches (712 mm) off floor to a minimum height of 8 feet (2438 mm) A.F.F.

Solid surfacing wall finishes shall extend from top of shower pan to 84" and shall surround the shower enclosure. Wall finish shall surround tub shower.

Provide architectural feature walls consisting of mineral composite wall, glass, or trans resinous separating public areas in dining hall.

All interior wall finishes are indicated in the “Room Requirements” portion of this RFP

C3020 FLOOR FINISHES

Primary floor finish for all public spaces to include building entrances, Queue, Dining, and patron-side serving areas shall be min 12”x12” Non-slip, thru-color, porcelain tiles with coordinating tile base. Provide multiple colors, sizes, and/or styles to create design for Customer’s and NAVFAC Interior Designer’s approval. Provide manufacturer’s full range of colors and styles. Tile shall be a minimum of two grades above base grade.

Non-slip, thru-color, quarry tiles with coordinating tile base shall be provided in all food prep, cooking, and dish/utensil washing areas.

Provide epoxy grout in all areas

Provide matching floor tile cove base and pre-formed corners.

Thresholds of nonferrous materials shall be used where flooring materials change in all areas except as noted.

Floor finishes shall be as indicated in the “Room Requirements” portion of this RFP.

Exposed concrete floors shall be coated with a sealer appropriate to the function of the space.

b. 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. Exposed concrete floors that are not required to have an applied floor finish, shall receive a minimum of 3 coats of the manufacturer's approved sealer.

C3030 CEILING FINISHES

Finished surface of ceiling tiles shall be selected to address acoustical, maintenance, moisture or impact resistance requirements of the room.

Primary ceiling finish shall be 24 inch by 24 inch by 5/8 inch minimum thickness suspended acoustical panel ceiling system. Acoustical panels shall have a tegular reveal edge with 9/16” grid. Provide fine fissured panel surface. Provide suspended gypsum board ceiling areas and detail soffits in the dining area and over serving line (for user supplied graphics). Provide suspended moisture resistant, gypsum board ceilings in all shower areas, food prep, cooking, and dish/utensil washing areas. For projects that require a LEED rating provide environmentally friendly panels. Ceiling must be at a 11’-6” min over all beverage serving and ice machine areas.

Provide suspended gypsum board ceiling details in public areas as indicated in the “Room Requirements” portion of this RFP.

Exposed structural systems shall be painted according to PTS Section C3040 INTERIOR COATINGS AND SPECIAL FINISHES.

Ceiling finishes shall be as indicated in the “Room Requirements” portion of this RFP.

C3040 INTERIOR COATINGS AND SPECIAL FINISHES

Paint all interior exposed surfaces including metal items, such as interior grilles, registers, diffusers, access panels, and panel boxes to match adjacent surfaces.

Concrete block walls shall be one-coat of latex block-filler followed by one-coat of alkyd wall primer/sealer and one finish coat alkyd semi-gloss enamel paint.

Gypsum board shall receive latex primer and two coats of eggshell finish, lead-free paint.

Moisture resistant gypsum board ceilings shall receive epoxy paint to withstand frequent steam and cleaning.

All primer and paint systems shall be the manufacturer’s highest premium quality professional grade. All materials shall be moisture and mildew resistant and easily cleaned. Do not use lead or lead-based paint.

Painted wall systems shall be painted according to Section C3040 INTERIOR PAINTING AND SPECIAL FINISHES.

All finish coatings shall be as indicated in the "Room Requirements" portion of this RFP.

--End of Section--

6. ENGINEERING SYSTEM REQUIREMENTS

D20 PLUMBING

Refer to Part 5 Section D20 for performance requirements of the building elements included in the plumbing system. All design and installation shall be in accordance to the latest edition of MCB Camp Lejeune N.C. Mechanical Policies dated 20 June 2008, and Seismic Design for Mechanical Systems dated May 2002. (These policies are included as attachments in the Part 6 of this RFP package.)

Design and installation shall be in accordance to the latest editions of the International Mechanical Code (IMC), International Plumbing Code (IPC), all applicable UFC, NFPA standards, DOD design publications (including the mechanical policies referenced above). All plumbing calculations shall be submitted for approval with all design submissions. Please refer to section Z10 under the Performance Technical Specifications, specifically paragraph 1.2 – Design Guidance.

All calculations, basis of design, and other design documents shall show and demonstrate how the design strategies will meet the LEED requirements. All design submissions, including calculations, shall show the LEED intent and how it can be met. Calculations shall include ASHRAE 90.1 - 2007 and EPACT 2005 analyses. Calculations shall include safety factors.

EPACT 2005 is based on ASHRAE 90.1-2004. The plumbing design and hot water tank sizing shall be based on the latest ASHRAE 90.1, which is 2007.

In calculations show the energy savings and efficiencies for the facilities. Calculations shall provide the plumbing system design. Pressure drop calculations shall provide for allowances for hot water tank sizes, heat exchangers, safety factors, etc. Provide heat transfer equipment with allowances for fouling factors. Calculations shall include life cycle cost analyses that show the new facilities will provide 30% energy efficiency in compliance with EPACT 2005 and EISA 2007

SYSTEM DESCRIPTION

Provide complete and usable domestic cold/hot water distribution (steam heated hot water; HW recirculation loop), sanitary drainage, and a propane distribution systems with all associated fixtures, equipment and appurtenances. Provide utility connections to all specialty galley equipment include dishwashing equipment, propane-fired cooking equipment steam cooking equipment, sinks, beverage dispensers, and ice makers. Provide grease traps. Provide special high temperature sanitary drainage system with grease traps. Provide special systems including a complete cooking oil management system including indoor and outdoor tanks (as required), pumps, piping, filters, controls, and fill station. Special systems also include a remote, outdoor washing station including deep-basin sinks and instantaneous electric domestic water heating. Refer to ESR D30 for steam system requirements to serve cooking equipment, to serve building heating, and to serve hot water heating

Provide a crawl space under the kitchen areas for the dining facility. All interior steam and condensate distribution systems for the galley cooking equipment and all sanitary and high temperature sanitary piping for the galley and kitchen shall be routed through the crawl space. All sanitary and high temperature sanitary piping and steam and condensate piping for the galley and kitchen in the crawl space shall be hung from the floor slab and shall not block access to any part of the crawl space. All piping and steam and condensate components located within the crawl space shall be completely accessible for ease of maintenance. Steam and condensate is required for the galley cooking equipment.

The plumbing system for Enlisted Dining Facility 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 1.5 meter (5 foot) of the building. Refer to Building Requirements, Space Tabulations Section of the Project Program for building occupancy levels.

The intent of the plumbing system design for the Enlisted Dining Facility is to provide a system that meets all applicable codes and standards for commercial dining facilities

Refer to paragraphs D2090 OTHER PLUMBING SYSTEMS (and following) for system descriptions and requirements. Provide complete specialty systems including the following:

Solar hot water heaters if life cycle cost effective as compared to other technologies, not less than 30% of the hot water demand.

High temperature grease interceptors for the dining hall

Hydro-pneumatic pressure wash system for the dining hall

Cooking oil management system

Requirements for steam services to steam-fired kitchen equipment in the Dining Facility are covered in ESR D30. Requirements for gas services to gas fired (propane) kitchen equipment in the dining facility are covered in this ESR at D209001.

Waterless urinals are not permitted for this facility. Use low flow fixtures in view of achieving LEED credit WE-3 for Water Use Reduction.

GENERAL SYSTEM REQUIREMENTS

Provide working space around all equipment. Working space shall meet OSHA requirements. Working space shall allow space to perform maintenance functions as well as to pull all coils, pumps, heat transfer surfaces, valves, valve operators, dampers, controls, wiring, conduit, fans, motors, etc. Provide all required fittings, connections and accessories required for a complete and usable system. Provide 100 mm (4 inch) thick concrete pads under all major floor mounted plumbing equipment (domestic hot water storage tank(s), etc). Provide all required fittings, connections and accessories required for a complete and usable system. All equipment shall be installed per the criteria of RFP section D20 and the manufacturer's recommendations. Design and installation shall be in accordance with IPC and UFC 3-420-01, *Plumbing Systems,* UFC 3-400-10N, *Mechanical Engineering, North Carolina Plumbing, Building, and Mechanical Codes,* NFPA standards, and DoD design publications (including the Camp Lejeune Mechanical Policies referenced above). Where the word "should" is used in the manufacturer's recommendations, substitute the word "shall".

The advisory provisions of all codes, requirements, standards, and UFC's shall be mandatory. Substitute words such as shall, must, or required for such words as should, may, recommended, recommend, guidance, guide, wherever they appear, The results of the word substitutions incorporate these codes, standards, and UFC's, as meaning requirements. See also section Z-10 in the PTS section for further requirements.

Steam shall be utilized for the generation of domestic hot water. Provide a commercial steam to hot water storage tank heater to be located in the Steam Mechanical Room, which is the wet mechanical room.

Provide a thermal expansion tank to be located in the in the cold water supply to the water heater. Provide a domestic hot water pumped recirculation system. The domestic hot water recirculation pump shall be suitable for potable hot water. Provide balancing valves at the connections of the recirculation piping to domestic hot water piping. Domestic cold water supply piping to the building shall enter in the mechanical room. Provide backflow protection for the building water supply by a reduced pressure principal type back-flow preventer. Provide air gap fitting on each test drain connection and pipe to discharge on grade outside of the building.

All piping located below the building shall be supported from the building support slab if a supported floor slab is used. Design and installation shall be in accordance with the International Plumbing Code (IPC),

North Carolina Building and Mechanical Codes, and UFC 3-420-01, *Plumbing Systems*. Where the word "should" is used in the manufacturer's recommendations, substitute the word "shall".

Low Impact Development (LID) requirements: The plumbing systems shall be commissioned in accordance with Project Program Section 2.2.3.

Toilet group shut-off valves shall be provided to isolate toilet groups from the main domestic water lines. Provide a separate pipe network and valves for "Gray Water" systems serving water closets, urinals, and trap primers. Individual fixture shut-off valves shall be provided at every fixture. Shut-off valves shall be concealed from view and located for ease of access. Access doors shall be provided for all shut-off valves located within walls or above hard ceiling construction. Provide access to all shower valves.

All domestic and gray water piping shall be insulated and identified. All domestic and gray water distribution piping shall be located above the corridor ceiling spaces. Passage of all piping through electrical and telecommunication spaces is prohibited. All domestic and gray water piping shall be concealed above the ceiling or within chases. All piping shall be concealed from view in all occupied spaces.

Provide floor drains in the mechanical room(s) for air conditioning condensate and water heater drainage. Condensate and drain piping shall be installed to avoid interference with equipment access and trip hazards. Equipment with drain traps shall be installed to allow room for traps, drain lines and gravity drainage.

Provide an adequate number of floor drains to avoid running condensate and drain piping across open floor space. Sanitary cleanouts shall not be installed within occupied spaces, except for toilet and janitor spaces.

Minimize the length of main building service piping under the building floor slab.

Condensate and drain piping shall be installed to avoid interference with equipment access and trip hazards. Equipment with drain traps shall be installed to allow room for traps, drain lines and gravity drainage. Provide an adequate number of floor drains to avoid running condensate and drain piping across open floor space. Sanitary cleanouts shall not be installed within occupied spaces, except for toilet and locker rooms.

D2010 PLUMBING FIXTURES

Provide quantity and type of plumbing fixtures required for the occupancy, use, and functions described for this facility. Refer to Room Requirements Section for additional specific requirements for spaces with plumbing fixtures. Provide handicapped fixtures in accordance with the referenced criteria in the Project Program.

D201001 WATER CLOSETS

Refer to Room Requirement Section for the number and type of water closets required. All water closets shall be the low or ultra low water usage type.

Provide floor mounted flush valve type water closets with electronic control in all public and staff restroom spaces. Electronic control shall be hard-wired only.

Provide handicapped flush valve type water closets in with electronic control in all public and staff restroom spaces as required. Electronic control shall be hard-wired only.

D201002 URINALS

Refer to Room Requirement Section for the number and type of urinals required. All urinals shall be low or ultra low flow usage (less than or equal to 1 gallons per flush (gpf). Waterless urinals shall not be provided.

Provide flush valve type urinals with electronic control in all public and staff restroom spaces. Electronic control shall be hard-wired only.

Provide handicapped flush valve type urinals with electronic control in all male public and staff restroom spaces as required. Electronic control shall be hard-wired only.

D201003 LAVATORIES

Refer to Room Requirement Section for the number and type of lavatories required. Provide wall mounted vitreous china lavatories with shelf back and electronic control in the restrooms. Provide handicapped lavatories in each restroom space. Electronic control shall be hard-wired only.

D201004 SINKS

Refer to Room Requirement Section for the number and type of sinks required.

Provide stainless steel hand wash sinks with hard-wired electronic control for kitchen hand washing stations.

Provide stainless steel kitchen sinks with the proper number of compartments in the kitchen, food preparation and dishwashing spaces. Provide a floor type service sink in the Janitor's closet space.

Provide service sinks in the janitor spaces. Provide with faucet set having a pail hook, vacuum breaker, and ¾-inch threaded hose spout outlet.

D201005 SHOWERS/TUBS

Refer to Room Requirement Section for the number of showers required. All showers shall be the low flow type. The shower heads shall be located at a stationary position pointed away from the shower entrance opening and to keep from spraying toward the shower entrance opening and causing water damage.

Provide solid surfacing material on walls and precast terrazzo floors for shower enclosures.

Provide solid surfacing material on walls and precast terrazzo floors for handicapped shower enclosures.

D201006 DRINKING FOUNTAINS AND COOLERS

Refer to Room Requirement Section for the number and type of electric water coolers required.

Provide electric water coolers outside the public and employee restroom spaces. All electric water coolers shall be handicapped accessible.

D2020 DOMESTIC WATER DISTRIBUTION

Coordinate domestic water pressure requirements with the civil engineering water distribution design. Provide a minimum domestic water pressure of 25 PSIG at all fixtures on all floors. Contractor shall perform water flow tests in new distribution to verify flow and pressure to show it meets design requirements. Contractor shall provide flow tests in existing water distribution system at or near connection points. Water pressure at all fixtures shall be 25 psig or in accordance to plumbing codes, UFC, and NC building codes, whichever has the higher pressure. The contractor shall provide water flow and pressure tests at the highest point in every facility to demonstrate the required flow and pressure and that the plumbing fixtures will operate as required by the design calculations. For each facility review the requirements for meeting the calculated and designed potable water demand. The contractor shall determine if a pump pressure booster system is required. If the tests and calculations show that a pressure booster system is required, the contractor shall provide all necessary equipment, controls, piping, system for a complete and usable pumped pressure system to serve all of the plumbing requirements in the facility.

Perform flow tests at each project site on the existing site water system to determine system requirements.

Provide data in the following format for each test:

For Pxxx
Date: Time:
Location: MCB Camp Lejeune, Road:
Static pressure: data - xx psi
Residual pressure: data - xx psi
Flow: data xxxx gpm

D202001 PIPES AND FITTINGS

Provide Type L Copper tubing and fittings for above ground and Type K for buried piping. No other pipe materials shall be used. Only the main building water service and trap primers will be permitted under floor slab but supported from the slab. Minimize the length of main building service piping under the building floor slab. Press, extruded, and groove type fittings shall not be used or allowed. Copper pipe shall be used for the gray water system.

D202002 VALVES & HYDRANTS

- Provide valves at water supplies to fixtures and to provide ease of maintenance as required in the International Plumbing Code (IPC), State of North Carolina Building Codes, and the other required codes and standards listed in this specification. Provide hose bibs in mechanical rooms.
-
- Provide hose bibs along the building exterior such that all points along the perimeter can be reached with a 30 meter (100 foot) long hose, in accordance with MCB Camp Lejeune Mechanical Policy.
-

Provide isolation valves at the supply to the system. Provide sectional shutoff valves for domestic hot and cold water for each bathroom (group). Frost proof hose bibs shall not be provided. All valves shall be accessible.

D202003 DOMESTIC WATER EQUIPMENT

Provide reduced pressure principle type backflow preventer at the service entrance inside the mechanical room.

Provide reduced pressure principle type backflow preventer at all make-up water lines inside the mechanical room and at all make-up water lines to systems containing chemical treatment.

Provide water meter at the service entrance of the facility. Provide an ASME code stamped and glass lined domestic hot water storage tank. The lining shall meet NSF 61.

For steam to hot water storage type heaters: Water heaters shall meet ASHRAE 90.1-2007. Steam to hot water storage heaters and all steam equipment shall be provided in a separate steam mechanical room.

Provide a storage type steam to hot water generator for the heating of domestic water. The steam heat exchanger shall be double wall. The tank shall be glass lined to meet NSF 61. The generator shall meet ASHRAE 90.1-2007, be energy star rated, and stamped to meet ASME boiler pressure vessel code requirements.

Steam piping and equipment shall be in a self-contained “Dedicated Steam Equipment Room” or a Wet Mechanical room. Piping penetrations from this room into the Dining Facility shall be tightly sealed to prevent steam from leaving the Dedicated Steam Equipment Room in the event of a steam pipe rupture. The dedicated steam equipment room shall have double doors to the outside The dedicated steam equipment room shall be designed to contain steam in event of a leak. Steam and condensate piping requirements are covered in ESR D30.

Provide domestic hot water recirculation system with high efficiency recirculation pump. Provide in-line circulator for domestic hot water distribution system.

Provide a water meter.

The hot water design shall be performed in conjunction with the HVAC systems, in meeting EPACT 2005. The designer of record shall evaluate the domestic hot water system types or combination of types, in view of meeting the EPACT 2005, Energy Independence and Security Act (EISA) 2007, ASHRAE 90.1-2004 and LEED silver requirements for this project. A life cycle cost analysis shall be performed on these systems and included with the EPACT 2005 calculations. Submit calculations at the 35% design submittal. The designer of record shall select a hot water service system based on fully meeting the EPACT 2005 and EISA 2007 goals. Consider and provide analysis for using instantaneous electric water heaters, energy reclaim from chillers, and/or propane, and steam storage type heaters, propane, and steam storage heaters supplemented by solar heating hot water heating system, supplemented by solar assisted water source heat pumps in view of achieving LEED credits under EA-1 (Optimize Energy Performance). 30% of the hot water demand shall be provided by solar hot water heating system, if life cycle cost effective. Provide energy calculations, system design and life cycle cost calculations. On the use of ASHRAE 90.1-2004- Use with EPACT 2005 calculations. Use ASHRAE 90.1-2007for all calculations and plumbing system design

Provide a domestic water booster system for the domestic water distribution system where needed to maintain fixture or make-up water pressures.

D202004 INSULATION & IDENTIFICATION

Provide rigid insulation (polyisocyanurate or cellular glass) with vapor barrier on all domestic water (hot and cold) supply and recirculation piping. Provide identification for all piping and equipment.

D202005 SPECIALTIES

Provide washing machine connector boxes for clothes washers. Provide domestic water connector boxes for refrigerators, ice-making machines, and coffee brewers. Provide valve boxes for buried valves. Provide domestic water to each dishwasher. Provide domestic water connections for all dining hall equipment requiring these services, including sinks (hand, 3- compartment scullery, and mop), ware washers, automatic coffee urns, and ice makers/beverage dispensers. Provide water filters where required for the dining hall equipment.

D202090 OTHER DOMESTIC WATER SUPPLY

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

D2030 SANITARY WASTE

D203001 WASTE PIPE & FITTINGS

Provide high silicone cast iron for all high temperature caustic waste. The rubber gasket joints shall be suitable for high temperature grease waste. This applies to all kitchen waste piping.

Provide plastic PVC piping, fittings, and solvent cement for above and/or below ground installation. PVC shall be schedule 40 solid.

Provide two separate and independent sanitary systems for the Mess Hall.
One system shall route all kitchen products generating greasy wastes through a grease interceptor. The other system shall bypass the grease interceptor and be used for all waste products not containing kitchen greases. Plastic piping shall not be used in the waste pipe originating at high-temperature drains in the dining hall facility. Provide a high temperature grease interceptor for the dining hall.

In the dining hall, for the kitchen sanitary waste system up to the grease interceptor, provide high silicone and ductile iron hub and spigot pipe and fittings, rubber compression gasket joints for above and below ground installation. High silicone iron pipe shall be used for high temperature and caustic waste portions of the sanitary system (at and above 140°F).

The kitchen sanitary waste systems shall include all waste streams generated from the kitchen that contain wastes that are above 140°F and/or grease laden wastes. All other dining hall sanitary systems including the sanitary system downstream of the grease interceptor shall be plastic PVC piping, fittings, and solvent cement for all above and below ground installations.

D203002 VENT PIPE & FITTINGS

Provide high silicone cast iron or ductile iron hub and spigot pipe and fittings, rubber compression gasket joints for high temperature systems.

Provide plastic PVC piping, fittings, and solvent cement. PVC shall be schedule 40 solid. See also D203001 WASTE PIPE & FITTINGS.

D203003 FLOOR DRAINS

Provide floor drains in the kitchen, mechanical room(s), laundry room, restrooms, plumbing chase areas, to receive condensate from air handling equipment and wastewater from other areas noted

including the can wash area. Provide deep seal traps on all floor drains. For all floor drains, provide automatic trap primers. Automatic trap primers are for maintaining fluid in the drain trap seal to prevent loss of fluid loss from evaporation. Refer to the Camp Lejeune mechanical policies regarding the trap primer requirements and locations.

D203004 SANITARY & VENT EQUIPMENT

Provide drain connections for dishwashers. Provide sanitary connections for all dining hall equipment requiring these services, including sinks (hand, 3-compartment scullery, and mop), ware washers, disposers, floor troughs, and ice makers/beverage dispensers. Provide condensate drainage systems as required for refrigeration equipment in the mess hall.

D2040 RAIN WATER DRAINAGE

D204002 ROOF DRAINS

Interior roof drain piping systems for rain water shall not be provided and are not allowed. All roof drainage shall be by scuppers and outside system.

D2090 OTHER PLUMBING SYSTEMS

D209001 SPECIAL PIPING SYSTEMS

For steam and condensate: See D30 and G30 requirements.

D209002 COOKING OIL MANAGEMENT SYSTEM

Provide a complete and usable cooking oil management system for the dining hall, including storage tanks and piping. The system shall include indoor tanks, pumps, piping, filters, controls, automated notification system an outdoor fill station, and all accessories. The fill station shall be in an accessible station for filling from a vehicle. The system shall be commercial grade and shall be sized corresponding to the grease-cooking operations (usage and demand) of the dining hall. The system tanks shall have sufficient capacity for a minimum seven days of continual cooking operations. Piping system shall be double wall type system suitable for cooking oil.

D209003 INTERCEPTORS

Provide a high temperature grease separator to receive all kitchen waste products containing greases. The grease interceptor shall be located outside of the facility in a suitable location that shall not hinder maintenance or accessibility for cleaning.

D209004 HYDRO-PNEUMATIC PRESSURE SYSTEM

Provide a hydro-pneumatic pressure system for washing trash containers in the can wash area. The hydro-pneumatic pressure system shall be capable of washing trash containers with pressurized domestic hot water.

--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. All design and installation shall be in accordance to the latest edition of *MCB Camp Lejeune N.C. Mechanical Policies and Seismic Design for Mechanical Systems*, June 2008 (included as an attachment in the Part 6 of this RFP package). Provide HVAC and mechanical systems in accordance with UFCs listed for the facilities as well as UFC 3-400-10N, *Mechanical Engineering, Final Draft* and UFC 3-410-02N, *Heating, Ventilating, Air Conditioning and Dehumidifying Systems*. In addition, the NAVFAC Interim technical guidance (ITG) FY05-02, *NAVFAC Humid Area HVAC Design Criteria* shall be utilized and met. A copy of the criteria is attached in Part 6, Attachments. Refer to section Z10 under the Performance Technical Specifications, specifically paragraph 1.2 – Design guidance

All calculations, basis of design, and other design documents shall show and demonstrate how the design strategies will meet the LEED requirements. All design submissions, including calculations, shall show the LEED intent and how it will be met.

The facility must meet the standards for energy conservation as required by UFC 3-400-01, *Energy Conservation*, dated 5 July 2002 Including Change 4, August 2008. The designer shall submit ASHRAE 90.1 calculations for approval at each submission. The latest edition of ASHRAE 90.1, ASHRAE 62.1 and their User Manuals shall be used. The project shall be evaluated by the designer of record in view of meeting the Energy Independence and Security Act (EISA) 2007 and LEED requirements for the project. Calculations shall also include ASHRAE 90.1 2007 analysis utilizing the Performance Rating Method specified in Appendix G of the standard as modified in UFC 3-400-01 paragraph 2-1 (per Energy Policy Act of 2005 (EPACTO 2005)). The EPACTO 2005 calculations shall show that the new facilities will provide a 30% energy performance improvement over a baseline building. An ASHRAE 90.1 2007 certificate of compliance shall be provided.

Calculations shall provide HVAC system design on psychrometric charts to verify entering and leaving conditions, and final room conditions. Pressure drop calculations shall provide for allowances for dampers, grilles, balance dampers, coils, circuit setters, heat exchangers, safety factors, etc. Provide heat transfer equipment with allowances for fouling factors.

All energy calculations described above shall include the effect of energy savings due to solar heating of domestic water, heat recovery applied to VAV reheat due to auxiliary condenser(s) of air cooled chiller(s), photovoltaic panels, day lighting, and heat recovery from exhaust air due to an enthalpy type heat wheel and a heat pipe type heat exchanger.

To obtain the current energy costs for use with the life cycle cost analyses contact the Energy Branch – Mr. Kyle Brown at kyle.t.brown@usmc.mil.

SYSTEM DESCRIPTION

Provide heating, ventilating and air conditioning (HVAC) systems for the Dining Facility that attains the following objectives: Occupant comfort, Indoor air quality, Acceptable noise levels, Energy efficiency, Reliable operation, and Ease of maintenance. Design and installation shall be in accordance with IMC and UFC 3-400-10N, *Mechanical Engineering*. 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.

Provide complete and usable heating systems for building heating, steam for galley equipment, and natural for galley equipment, ventilating, and air conditioning (air cooled chiller with primary/secondary or constant flow pumping) systems, including all piping, ductwork, equipment and apparatuses. General system type shall be variable-air-volume air handlers with fan-powered terminal units. Special systems include grease and ventilation hoods, a ductless split system for the COMM room, and make-up air units for the kitchen.

The make-up units for the kitchen shall be of the type that delivers the makeup air immediately adjacent to the hoods through a perforated plate having a width equal to the width of the hood. These makeup units shall be arranged to supply filtered (MERVE 13) and **uncooled** makeup air equal to 85% of the hood requirement only with outside air temperature above 75°F. With outside air temperatures below 75°F, makeup air shall be by means to be described herein below.

Special systems also include heating and ventilating two mechanical spaces (wet steam room and a mechanical room) and electrical room.

Enthalpy type heat wheel energy recovery system: Provide an injection type outdoor air supply and energy recovery system for the dining area having a variable speed injection fan, variable speed total enthalpy heat wheel with wheel bypass dampers, and a general exhaust system with variable speed fan that is capable of increasing exhaust beyond the minimum building requirements to support the maximum requirements of outdoor air supply injection fan. Provide controls to integrate this energy recovery system with the dining area VAV system to be described. It should be noted that control of the injection type outdoor air supply and energy recovery system requires the conventional return damper to be omitted, but a relief damper be added through which return air is converted to general exhaust air. Also it is essential to note the heat wheel must run full speed with the outside air dew point above that of the VAV design supply dew point, but must have its speed modulated to prevent it from overheating (hold design VAV supply air dry bulb temperature) with outside air dew point below the VAV design supply dew point The outside air dew point sensor-transmitter shall be a chilled-mirror hygrometer equal to that manufactured by Michell. Flow sensing devices equivalent to the type manufactured by Air Monitor are required in both the supply and general exhaust of this device for proper control of this system. The chiller shall be selected to provide 100% designed capacity in the event of a failure of the heat wheel.

Provide heat recovery from the air-cooled chiller(s) through an auxiliary condenser to apply to air terminal reheating and preheating and arrange piping and controls such that this recovered heat is fully applied before the heat from the modulating gas fired boiler(s) is applied.

Provide a solar heating system for domestic hot water and air preheating. Deliberately consider heavy duty dish and pan washing, schedule, and hot water storage requirements obtained from the base. Deliberately arrange it for an imaginative pleasing exterior appearance. Collectors shall be of the evacuated tube type equal to those by Sunmax. Provide all piping, controls, heat dumps, and appurtenances for a complete system.

Provide Radiant barriers on mechanical systems and equipment

All facilities shall be designed in conformance with the latest editions of ASHRAE Standard 90.1: Energy Standard for Buildings except Low-Rise Residential Buildings, ASHRAE Standard 62.1: Ventilation for Acceptable Indoor Air Quality, American Conference of Governmental Industrial Hygienists (ACGIH) Industrial Ventilation manual, International Mechanical Code (IMC), North Carolina Mechanical Code, and the International Plumbing Code (IPC). The designer shall also use the latest editions of the User manuals for ASHRAE 90.1 and ASHRAE 62. In addition to references and standards required, HVAC systems shall be designed in conformance with the latest ASHRAE Handbooks and ASHRAE standards.

Direct expansion multizone systems, direct expansion variable air volume systems, and thru-the-wall units are not acceptable. Economizer cycles shall not be used.

The Galley HVAC system shall consist of a variable air volume (VAV) system having water reheat terminal units. It shall be capable of delivering makeup air at several controlled constant volume values as follows; none (night set back or set up operation), minimum ventilation for occupants, and all combinations of range hood exhaust to supply each operating hood at 15% of the hoods requirement when the outside air temperature is above 75°F (makeup air units immediately adjacent to the range hoods to supply 85%). A flow sensing device equivalent to the type manufactured by Air Monitor is required for proper control of this unit. Note that controls shall reset the minimum flows of the terminal units as necessary to allow the appropriate ventilation. A commercially available HVAC system having integral controls that can accommodate the above coordination with range hoods is preferred.

This contractor shall be responsible for determining the cooling capacity of this air handler to meet the temperature and humidity scheduled herein below, but in complete disregard of the fact of warm air introduced by the immediately adjacent makeup units. That is, this contractor is responsible only for the correct mathematics that considers no effect due to this warm air. He shall not be held responsible for the temperature and humidity values that will actually be realized. The owner has taken responsibility for this.

All of the following system requirements shall be met:

Equipment support/access: Access to air handling equipment in the attic/ceiling shall be through lockable and hinged ceiling access panels(s) of sufficient size to allow removal of the equipment without damaging and/or demolishing the ceiling/attic. Where required, provide personnel access by stairways to the attic space. Equipment access platforms shall be provided in the Mechanical Room and the wet mechanical room to service any equipment mounted 8 feet or higher above the finish floor. A fixed stairway access to the platform shall be provided.

The only equipment permitted on the roof of the facility is rooftop mounted exhaust fans condensing units for freezers and refrigerators, and modular make-up air units for the kitchen. No exposed ductwork is permitted. Rooftop equipment must be accessible by stairs. Ladders are not permitted.

Vibration and noise: Design the HVAC and mechanical systems to minimize vibration and noise to the facilities.

Hydronic System Appurtenances: Provide chemical shot feeders, air separators, and diaphragm expansion tanks for hydronic systems. Base mounted centrifugal pumps shall be equipped with inlet suction diffuser, isolation valves, discharge check valves, balancing valve, drain valve, differential pressure gauge, flexible pipe connectors and coupling guard. Provide all required fittings, connections and accessories required for a complete and usable system. Press-on fittings, groove joint type fittings, and extruded fittings for pipe and tubing shall not be used.

Seismic Design: Provide structural seismic restraints for mechanical and plumbing systems. Requirements for seismic design is covered by Seismic Design for Mechanical Systems, dated May 2002 as given in part 6. Drawings shall show seismic design and restraints for mechanical and plumbing systems.

Energy Recovery and Outdoor Air: Outside air systems and energy recovery shall be provided for the entire dining facility. The intent of pre-conditioning outside air is to remove moisture and control humidity. Energy recovery is utilized to meet energy efficiency goals.
For all areas except the kitchen, 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. All exhaust and outdoor air shall be passed through the heat wheel(s). The total enthalpy heat wheel(s) shall be located in the mechanical room or the attic space, and shall be easily accessible for maintenance. In the event of energy recovery system failure, the outside air ventilation system shall be designed to provide 100%, full, and complete cooling and heating utilizing chilled water and hot water coils. Failure of the energy recovery system should not affect the capability of the outside air system in any way.

From kitchen hood exhaust, at outside temperatures below 55°F, recover kitchen exhaust heat from combined exhaust ductwork, using a heat-pipe type heat exchanger and transfer the heat to the mixed air point of the dining area VAV unit. The heat-pipe type heat exchange system shall be easily cleanable, have controls as part of its supplied package, and shall be by a firm having the ability to custom fit the particular situation. The system and service shall be equivalent to that supplied by Carolina Heat Pipe Inc.

Kitchen exhaust shall maximize the use of dining room make-up air that is provided by the VAV system through the dining hall with outside temperatures below 75°F. Provide transfer openings in the wall that separates the Galley from the dining room to allow the makeup air to pass.

Exhaust Systems – General
Provide kitchen exhaust systems consisting of grease and ventilation hoods, where necessary and required in the room requirements sheets and/or in this ESR section. Kitchen exhaust systems for cooking equipment shall be provided and designed to meet NFPA 1H, Part 5, Chapter 50, "*Commercial Cooking Equipment*", NFPA 96 (latest edition) "*Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations",* SMACNA 1767 "*Kitchen Ventilation Systems and Food Service Equipment Fabrication and Installation Guidelines",* North Carolina Mechanical and Building Codes, UFCs, latest edition of "Industrial Ventilation, A Manual of Recommended Practice; American Conference of Governmental Industrial Hygienists" and UFC 3-410-06N, Design: Industrial Ventilation. Kitchen exhaust systems shall have certified and listed hoods and equipment. Kitchen exhaust systems shall be self-cleanable with water wash hood systems, with emissions air cleaning.

Exhaust Systems - Specific
Restrooms, toilet, and locker areas shall be continuously exhausted.
Exhaust from locker areas shall be continuously drawn through the lockers.
The locker exhaust duct system shall be comprised of an aesthetically pleasing sloped top exhaust plenum mounted on top of the lockers. All exhaust shall be passed through the heat recovery unit(s).

Ventilated Area Pressure Control
Public restrooms, toilets, and locker areas shall be served by VAV terminal units consisting of shut-off VAV terminal units with hydronic reheat capability. No restroom or locker room air shall be re-circulated. The VAV terminal units shall be pressure independent. These VAV systems shall maintain a minimum airflow for proper air circulation. The minimum is 4 to 6 air changes per hour, air change rate shall meet all of the standards and code requirements listed within this specification.

Airside System Requirements
Provide HVAC systems using chilled water VAV with zone reheat from hot water. Provide variable air volume (VAV) systems. Size all supply ductwork using static regain methodology as per UFC 3-400-10N. The VAV systems shall consist of VAV air handling units and multiple VAV series fan powered terminal units for the Dining area and terminal units without fans for the Galley. The dining hall facility shall be completely conditioned (HVAC all areas) and served by VAV units.

The offices, breakroom, housekeeping room, dining areas, and mezzanine storage areas, shall be served by VAV terminal units consisting of series fan powered variable air volume terminal units with hydronic reheat coils. Maintain a minimum air flow for proper circulation of 4 air changes per hour. The VAV terminal units shall be pressure independent. The VAV terminal units shall maintain the air flow through the space while the primary air to the space is varied based on the cooling demand. The primary air valve/damper for all of the VAV terminal units shall have a minimum setting based on maintaining the minimum ventilation requirements. The primary air valve shall be sized to have a minimum inlet velocity pressure of 0.05 inches water static pressure and to have at least 0.5 inches water static pressure drop across the valve for proper operation. Hot water reheat capability at the VAV terminal units shall be provided by hot water reheat coils in the VAV boxes and shall provide reheat to prevent over-cooling of the spaces and for controlling humidity. The hot water reheat coils shall also provide space heating during morning warm-up and when space heating is required.

Waterside System Requirements

Cooling shall be provided a high-efficient, air-cooled chiller system, which will provide chilled water. The chilled water temperature shall be selected to provide maximum efficiency, cooling, and dehumidification. Chilled water shall be a primary/secondary or constant flow pumping system.

Heating system shall be hot water with primary/ secondary pumping. The hot water shall be a reverse return system.

Requirements for Specific Areas
Mechanical Rooms:
Mechanical Rooms shall be provided with hot water unit heaters and thermostatically controlled ducted inline exhaust fans to maintain room conditions as required in this section. Intake wall louvers shall be provided. Mechanical rooms with combustion units (boilers, hot water heaters, etc.) shall be provided supply fans vice exhaust fans as required in UFC-3-400-10N, to ensure positive means of ventilation control to eliminate any carbon monoxide and for positive means of combustion Louvers shall be located at least 10 feet from the bottom of the louver to the finished floor to meet AT/FP requirements. Mechanical room ventilations shall be provided to meet the codes and standards listed in the specification.

Electrical Rooms:
An electric unit heater shall heat the Electrical Room and a thermostatically controlled in-line centrifugal exhaust fan shall ventilate to maintain space conditions. Exhaust shall be ducted directly to the exterior at a wall louver. Louvers shall be located at least 10 feet from the bottom of the louver to the finished floor to meet AT/FP requirements

Comm Data Rooms:
Comm Data Rooms shall be for NMCI and communication/data equipment. Condition the room as per UFC 3-580-10. Provide ductless heat pump units.

Specific Requirements for the dining area:
The HVAC system for the Enlisted Dining Facility shall consist of a variable-air-volume (VAV) system and constant volume (CV) systems.

VAV system description: The dining and serving areas, public restrooms, corridors, offices and vestibule spaces shall be heated and cooled by a VAV system that is served by the injection type outdoor air supply and energy recovery system described above. All VAV terminals shall be provided with hot water reheat coils, and shall operate independently. All VAV terminals shall be accessible for maintenance. Access to VAV terminals located above ceilings shall be through lockable and hinged ceiling access panel(s) of sufficient size to allow removal of the mechanical equipment without damaging or demolishing the ceiling. Cooling for the VAV terminals shall be provided via a chilled water central station VAV air-handling unit located in the mechanical room. During non-dining hours and light loads, the central station VAV air-handling unit shall bring in the minimum amount of outside ventilation air required to meet the base ASHRAE 62.1 rate and allow for facility operations. The outside ventilation air requirements for the dining facility shall comply with the latest edition of ASHRAE 62.1.

The Dining Area HVAC unit shall be capable of supplying ventilation and/or makeup air at several controlled constant volume values for the following situations; for night set back or set up operation, no ventilation; with outside temperature below 75°F, the greater of required ventilation for occupants based on CO_2 concentration or the instantaneous value of Galley range hood exhaust less the ventilation air supplied by the Galley VAV unit (which supplements the range hood exhaust); and, with outside air temperature above 75°F, the required ventilation volume required for Dining Area occupants based CO_2 concentration. A commercially available HVAC system having integral controls that can accommodate the above coordination with range hoods is preferred. These ventilation requirements shall be obtained by signals from the said integral controls to the injection type outdoor air supply and energy recovery system described above. Note that controls shall reset the minimum flows of the terminal units as necessary to allow the appropriate ventilation.

Galley HVAC system Description: The Galley HVAC system shall consist of a variable air volume (VAV) system having water reheat terminal units. It shall be capable of delivering makeup air at several controlled constant volume values as follows; none (night set back or set up operation), minimum ventilation for occupants, and all combinations of range hood exhaust to supply each operating hood at 15% of the hoods requirement when the outside air temperature is above 75°F (makeup air units immediately adjacent to the range hoods to supply 85%). A flow sensing device equivalent to the type manufactured by Air Monitor is required for proper control of this unit. Note that controls shall reset the minimum flows of the terminal units as necessary to allow the appropriate ventilation. A commercially available HVAC system having integral controls that can accommodate the above coordination with range hoods is preferred.

This contractor shall be responsible for determining the cooling capacity of this air handler to meet the temperature and humidity scheduled herein below, but in complete disregard of the fact of warm air introduced by the immediately adjacent makeup units. That is, this contractor is responsible only for the correct mathematics that considers no effect due to this warm air. He shall not be held responsible for the temperature and humidity values that will actually be realized. The owner has taken responsibility for this.

Outside air (OA) ventilation system description: Provide CO_2 demand control ventilation for the Dining Area. Outside air shall be treated to ensure room design conditions are maintained. Reheat and humidity control shall be provided. Provide sufficient outside air to meet ASHRAE 62.1 requirements and satisfy facility operations.

The kitchen, food preparation, dishwashing, and can wash spaces shall have a negative pressure relative to the dining and serving spaces, offices, vestibule, and corridors. Provide exhaust and make-up air for all kitchen appliances as required by the equipment manufacturer. Conform to the latest codes and standards, including the NFPA codes and SMACNA standards for designing HVAC systems for kitchens and dining facilities.

Provide exhaust air for the restrooms and janitor’s closets in accordance with the latest edition of ASHRAE 62, IMC, and North Carolina Mechanical Code, whichever is the most stringent. Minimum exhaust air for the restrooms and janitor’s closets shall be no less than 47.2 L/s (100 CFM). Static pressures for the restrooms and janitor’s closets shall be negative as compared to adjacent spaces. Provide supply air, but no return air for the restrooms and janitor’s closets. Provide exhaust air for the storage rooms per ASHRAE 62 standards if required. Provide supply air for the storage rooms.

GENERAL SYSTEM REQUIREMENTS

Provide working space around all equipment. Working space shall meet OSHA requirements. Working space shall allow space to perform maintenance functions as well as to pull all coils, pumps, heat transfer surfaces, valves, valve operators, dampers, controls, wiring, conduit, fans, motors, etc. Provide all required fittings, connections and accessories required for a complete and usable system. All equipment shall be installed per the criteria in RFP Section D30 and the manufacturer’s recommendations. Where the word “should” is used in manufacturer’s instructions, substitute the word “shall”. Provide all required fittings, connections, and accessories required for a complete and usable system. All equipment shall be installed and provided per the requirements and criteria of ESR and PTS sections D30 and the manufacturer recommendations.

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

Summer	32.2	5 Degrees C dry bulb	Winter	-5	Degrees C
	90	Degrees F dry bulb		23	Degrees F
	26.1	Degrees C wet bulb			
	79	Degrees F wet bulb			

Dining and Serving Areas, Offices, Corridors, Cashier Area, and Vestibule Inside Conditions					
Summer	23.9	Degrees C dry bulb	Winter	20	Degrees C
	75	Degrees F dry bulb		68	Degrees F
	50	%RH			

Kitchen, Food Preparation, Dishwashing, Can Wash, Storage Room, and Restroom Inside Conditions					
Summer	25.6	Degrees C dry bulb	Winter	20	Degrees C
	78	Degrees F dry bulb		68	Degrees F
	50	%RH			

NMCI/Data/Telephone Room and Electrical Room Inside Conditions					
Summer	23.9	Degrees C dry bulb	Winter	7.2	Degrees C
	75	Degrees F dry bulb		45	Degrees F
	50	%RH			

Mechanical, Mechanical Wet Room, Fire Pump Room, and other Heating & Ventilating Inside Conditions					
Summer	5.6	Degrees C dry bulb	Winter	4.5	Degrees C
	10	Degrees F dry bulb above ambient		40	Degrees F
	15	Air changes per hour			

Provide Ventilation rates and systems per the latest edition of ASHRAE Standard 62, "*Ventilation for Acceptable Indoor Air Quality"*, North Carolina Mechanical codes, and the International Mechanical code, whichever is more stringent. The ASHRAE 62 user guide shall also be used and the ventilation effectiveness shall be determined and calculated. Pre-condition (heat, cool, and dehumidify to room design conditions) all outside ventilation air prior to admission into occupied spaces.

Provide ventilation for mechanical rooms to limit the temperature to not more than 5.6 degrees C (10 degrees F) above ambient.

The HVAC system shall provide each zone with the choice of heating or cooling year round unless otherwise indicated. Each zone shall have its own limited range of control, as allowed by the control system central workstation. Air Circulation: In each space and zone, provide for air circulation of a minimum of four (4) complete air changes per hour. Some spaces and zones may require more air circulation depending on the design. Provide an air circulation of a minimum of four (4) air changes per hour for each space served by the VAV terminal units.

Zone the HVAC system as follows:

Each dining and serving area shall be a separate zone.

Dishwashing, food preparation, and kitchen area shall be a separate zone.

Public and employee restrooms shall be separate zones

Storage rooms shall be separate zones.
Electrical room shall be a separate zone.

Mechanical room(s) shall be a separate zone, which is heated and ventilated only.

(For occupancy and hours of operation, refer to the Workflow Process in the Project Objectives.)

Noise levels shall comply with the requirements for hotels and motels in the ASHRAE Applications Handbook. See Section D30 for additional requirements. The design shall provide noise level control by requiring maximum noise levels as well as noise separation areas for the mechanical rooms. The drawings shall specify the maximum equipment noise level.

Material and Equipment Qualifications: All materials and equipment shall have been in satisfactory commercial or industrial use for 2 years prior to the bid opening. The 2-year use shall include applications of equipment and materials under similar circumstances and of similar size. The product shall 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 shall 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 shall 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 shall provide controllers including the required monitors and timed restart. Provide reduced voltage starters for all motors 25 hp and larger.

Provide 100mm (4-inch) housekeeping pads and vibration isolators under all floor-mounted equipment. Secure all floor-mounted mechanical equipment to the concrete housekeeping pads.

All mechanical equipment shall have painted finishes that pass a salt-spray test conducted per ASTM B117 for duration of at least 3000 hours.

All equipment shall be installed per the manufacturer’s recommendations and meet or exceed the ASHRAE 90.1 requirements, Energy Star or Federal Energy management Program (FEMP) recommended efficiencies.

D3010 ENERGY SUPPLY

Provide the following energy supply for the following the dining facility. The energy supply shall be provided as a complete and usable system. See Section G30 for exterior site civil/mechanical utilities for details and requirements.

D301002 GAS SUPPLY SYSTEM

Obtain natural gas pressures, system characteristics, and system requirements from the local gas

company: Piedmont Natural Gas Company. Contractor is responsible for providing the complete natural gas system to the facility, including any and all applications, fees, and permits.

Provide a complete and usable natural gas supply system to the heating equipment and the facility. All construction shall comply with the NFPA 54, North Carolina Building and mechanical codes, and the International Fuel Gas Code. Piping shall be black steel above ground and polyethylene below ground. The natural gas system shall meet Piedmont Natural Gas Company requirements.

If Piedmont Gas Company has not installed local service by the time of construction, construct a temporary propane gas installation.

D3020 HEAT GENERATING SYSTEMS

The heating load for this facility shall be served by at least 2 boilers. Each boiler shall provide 60 % of the load. All natural gas lines serving natural gas fired equipment shall be fitted with U.L. or Factory Mutual (F.M.) approved gas trains. Boilers shall be natural gas fired high efficiency type for hot water system. Extruded type, press type, and groove type pipe fittings shall not be provided and used.
For the mechanical room, piping penetrations from this room into the Dining Facility shall be tightly sealed. The mechanical room shall have double doors to the outside.
An Air Emission permit is required for each combustion device provided. Refer to Part 3, Section 3 of this RFP, paragraph 3.2.17, *Permits,* for Air Emission permit requirements.

D302001 Boilers

Provide high-efficiency modulating gas-fired condensing hot water boilers with forced fan or power burners for hot water system. Refer to the *MCB CAMP LEJEUNE, N.C. MECHANICAL POLICIES* for specific requirements regarding boilers. For facilities with heating loads requiring less than 1,200,000 Btu/h natural gas input, maximum boiler size shall be 400,000 Btu/hr.

If the facility heating load requires greater than 1,200,000 Btu/h natural gas input, provide a minimum of two larger cast iron sectional hot water boilers with forced fan or power burners.

In this case, provide pre-manufactured, stainless steel, multi-wall boiler stacks. Each boiler shall have its own stack. Stacks shall be insulated and shall meet NFPA 211 and be UL listed. Boilers shall have a combustion efficiency of not less than 80%. Provide a cast iron sectional boiler or steel tube firebox with power burners or modified scotch marine type for input loads of 399,999 Btu/hr or less. The boilers shall have a combustion efficiency of at least 80 percent or greater. Provide insulated boiler stacks meeting NFPA 211 and shall be U.L. listed. The boilers shall have positive forced air draft system.

All boilers shall be provided with Factory mutual (FM) or UL. Listed natural gas burner trains with all listed valves and controls. Boilers shall be forced draft fired.

D302004 Auxiliary Equipment

For the dining facility, provide a storage type domestic hot water generator. The generator shall use natural gas to generate 100% of the hot water for the plumbing system. See section D20 for requirements. The storage type hot water generator shall be located in the mechanical wet room, which is the steam mechanical room. The water heater shall meet ASHRAE 90.1-2007. See Section D20 for requirements.

See section D20 for requirements for EPACT 2005, ASHRAE 90.1-2004, and ASHRAE 90.1-2007, and Energy Independence and Security Act (EISA) 2007 and the LEED silver requirements for this project, including energy efficiency and hot water supplemented by solar heating hot water heating system.

For facilities with steam systems, provide a steam driven condensate return system and units.

D302005 EQUIPMENT THERMAL INSULATION

Provide rigid cellular glass insulation for hot and chilled water pumps and equipment. Provide vapor barrier for chilled water applications. Provide rigid cellular glass insulation for steam equipment.

D3030 COOLING GENERATING SYSTEMS

D303001 CHILLED WATER SYSTEMS

Provide chilled water system for service to the building HVAC equipment. Chilled water reset is not allowed. Provide air-cooled chillers and chiller plants with 100% full-sized pumps. Provide an auxiliary condenser in the chiller to rejected heat to reheat and preheat coils. Provide controls to accommodate the heat recovery process while providing the required cooling performance. Provide 100% standby pumps for all chillers/chiller plants. Pumps shall be base-mounted centrifugal pumps. The chillers/chiller plants shall provide cooling for 100% of the load for the facility/facilities. Provide high efficiency reciprocating, rotary screw, or scroll air-cooled chillers using a pumping system. The cooling load for this facility shall be served by the chiller and pumping systems.

For chilled water systems for the dining facility with a cooling load larger than 150 tons: provide aircooled chillers using a primary/secondary pumping system with variable speed secondary pumping.
For chilled water systems for the dining facility with a cooling load less than 150 tons, provide constant flow pumping system. For chiiled water systems larger than 150 tons, consider the cooling load being met by 2 chillers, each providing 50% of the load. For smaller systems les than 150 tons, the cooling load for each facility shall be served by 1 chiller providing 100 % of the load.

The air-cooled chiller(s) shall be located outside on 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.

Glycol/water mix shall not be used.

Total chilled water system volume shall be a minimum of 7 gallons per ton of cooling applied to primary loop. Provide an insulated inertia storage tank to meet this requirement.

Chiller(s) shall operate in temperatures down to 20 degrees F.

Provide factory corrosion protection coating on coils, minimum 3000 hours protection.

Provide heat recovery for reheat and preheat.

Provide insulation and vapor barrier on all chilled water equipment.

Provide commissioning and complete start-up and operational testing of chiller equipment and systems, including pumps, valves, gauges, controls, etc.

D303002 DIRECT EXPANSION SYSTEMS

Provide a direct expansion ductless split cooling only unit for cooling the Telecommunications/Data/NMCI room as per UFC 3-580-10. The ductless split cooling only unit shall cool all telecommunication/data/NMCI equipment loads within the room. Provide with a wall mounted adjustable thermostat.

Provide a direct expansion ductless split heat pump system for heating and cooling the electrical room. Provide with supplemental electric heater.

D3040 DISTRIBUTION SYSTEMS

D304001 AIR DISTRIBUTION, HEATING & COOLING

Provide insulated, galvanized steel double wall, preinsulated ductwork constructed, braced, reinforced, installed, supported, and sealed per the IMC and SMACNA standards for all exposed supply and return ductwork such as in the dining and serving areas. All other non-exposed HVAC ductwork shall be insulated, galvanized steel, braced, reinforced, installed, supported, and sealed per IMC and SMACNA standards. Provide air volume balance dampers in all main branch ducts. All air volume balancing dampers shall be accessible. If air volume balance dampers are located above hard ceilings (plaster, etc.), provide access panels to allow adjustments of dampers.
Provide series fan powered variable air volume (VAV) terminals with hot water reheat to heat and cool the dining and serving areas, cashier area, offices, public restrooms, corridors, and vestibule spaces. The VAV system shall use ducted returns. All VAV terminals shall maintain a minimum of four (4) air changes per hour for the zones they were designed.

All Series Fan Powered Variable Air Volume (VAV) units shall have ducted returns with aluminum filter return grilles. All VAV units shall be located above the ceilings and allow for maintenance and removal of units through lockable access panels.

Provide aluminum grilles, registers, and diffusers.

All VAV terminal units shall be located above the ceilings and allow for maintenance and removal of units through lockable access panels.

D304003 HOT WATER DISTRIBUTION SYSTEMS

Provide insulated, steel or copper hot water supply and return piping to serve the HVAC equipment throughout the facility. Provide a primary/secondary pumping system with variable frequency drive to serve the HVAC equipment throughout the facility.

Provide complete start-up and operational testing of all hot water and steam systems.

Provide flushing, cleaning, and start-up of hot water systems.

D304006 CHILLED WATER DISTRIBUTION SYSTEMS

For exterior buried chilled water distribution systems, coordinate with Section G30.

For larger chilled water systems (150 tons and larger), provide a primary/secondary pumping system with variable frequency drive to serve the HVAC equipment throughout the facility only on secondary chilled water pumps. For smaller chilled water systems, less than 150 tons, provide constant flow pumping to serve the HVAC chilled water equipment throughout the facility. Refer to the *MCB CAMP*

LEJEUNE, N.C. MECHANICAL POLICIES for specific requirements regarding primary/secondary variable speed pumping systems. Primary/secondary systems are not required for chilled water systems less than total facility cooling load of 150 tons.

Provide insulated steel or copper chilled water supply and return piping to serve the HVAC equipment throughout the facility.

Provide Cellular Glass insulation on all above ground chilled water distribution piping.

Provide valves and related chilled water system appurtenances.

Provide air control and chemical treatment equipment for the chilled water system.

Provide thermal mass capability in the chilled water system to insure proper control and longevity of chillers by using inertia tanks. Provide inertia tanks, sized per chiller manufacturer recommendation.

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

D304007 EXHAUST SYSTEMS

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 central exhaust system. The central exhaust system shall capture all exhaust air except for range hood exhaust, and route it through a total energy (enthalpy) type energy
recovery wheel (heat wheel) before exiting the facility in order to gain heat transfer between the incoming ventilation air and outgoing exhaust air. Minimize the number of rooftop exhaust fans. It is preferred to provide in-line exhaust fans. Roof top exhaust fans are not desired. Provide back draft dampers on all exhaust fans as required to prevent unconditioned air from entering the Dining Facility.

D304008 AIR HANDLING UNITS

Provide chilled water central station variable-air-volume (VAV) air-handling units to serve the dining facility. and serving areas, public restrooms, corridors, offices, and vestibule spaces. The dining area unit shall have water heat from solar panels, heat-pipe, water reclaimed heat from air-cooled chiller(s), and heating water preheat coils (all 4), arranged in said priority of operation. The Galley unit shall have water heat from solar panels, water reclaimed heat from air-cooled chiller(s), and heating water preheat coils (all 3), arranged in said priority of operation.

Provide with MERV 13 filters.

Provide with ultraviolet disinfection system.

D304090 OTHER DISTRIBUTION SYSTEMS

Provide base mounted circulating pumps.

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

D3050 TERMINAL & PACKAGE UNITS

D305002 UNIT HEATERS

Provide hot water unit heaters to serve the heating requirements of the mechanical room, wet mechanical room, fire pump room and similar type areas of the facility.

D3060 CONTROLS AND INSTRUMENTATION

D306001 HVAC CONTROLS

D306001-1.1 DIRECT DIGITAL CONTROLS (DDC)

Provide a complete Direct Digital Control (DDC) system for the facility. Provide complete direct digital control (DDC) systems which will communicate with the existing basewide DDC/EMCS system. The existing centralized Camp Lejeune DDC/EMCS system was manufactured by Johnson Controls and is the Johnson NAE system. The DDC systems shall be fully compatible with and shall fully communicate with the existing Johnson NAE system. (The Camp Lejeune Public Works Design Branch will be involved in programming their central control system to monitor the facilities via LAN connections.) The systems shall utilize electronic equipment controllers. The DDC system serving the facilities shall be designed to fully, automatically restart any and all HVAC systems in the event of power outages. Provide battery back-up on all DDC control panels. Contractor shall coordinate EMCS integration with Rich Barnes, EMCS Engineer. Richard.a.barnes2@usmc.mil.

A central DDC terminal located in the mechanical room shall monitor all control points within the facilities. Control set points shall be available for resetting in the following three ways: (1) in the mechanical rooms of the respective facilities, (2) at the central DDC terminal, and (3) via the centralized Camp Lejeune DDC system.

Contractor shall demonstrate full EMCS connectivity from the central monitoring and control station in building 1005 to building 1023. Contractor shall provide all necessary programming, connections information issuance forms required for complete EMCS integration.

The existing Energy Management and Control System (EMCS) at Camp Lejeune is an enterprise system that actively receives energy and building condition information from multiple sources and provides load shedding, electric metering, alarming, trending, scheduling, set point adjustment, device communications status of all SBC and TCU for maintenance personnel. This EMCS receives Real Time Pricing utility data and automatically manages to this site's base load profile. Provide a complete fully BACnet Open Protocol compatible Direct Digital Control (DDC) system. The DDC system shall be capable of controlling and monitoring all spaces and all HVAC systems. The manufacturer's control system shall have a successful, proven, in use history of at least 2 years. The DDC control system object configuration and communication shall be totally native BACnet Open protocol with no other programming language protocol, interface, or gateways utilized, except as required by the Project documents. Modify existing DDC systems including associated equipment and accessories. Manufacturer's products, including design, materials, fabrication, assembly, erection, examination, inspection, and testing shall be in accordance with ASME B31.1 and NFPA 70, except as modified herein or indicated otherwise. Provide the DDC systems to maintain stable temperature control and all other conditions as indicated. The end-to-end accuracy of the system, including temperature sensor error, wiring error, A/D conversion, and display, shall be 1 degree F or less. Provide a supervisory building controller (SBC) and license files to allow communication between the DDC system and the station's existing EMCS system. The existing station EMCS system is Johnson Controls and incorporates Metasys Extended Architecture Engine (NAE) System that communicates over the

Facility maintenance Ethernet communications network. The existing EMCS Central server is located at Building 24. Provide all necessary hardware, drivers, software, material, and equipment, which shall allow communication between the SBC and DDC upper level controllers. Provide an N2 building bus capable of connecting to an N1 Ethernet TCP/IP Level 1 network. The new DDC system naming nomenclature shall be compatible with the existing Johnson Control system. The new DDC system via the site building controller shall be capable of upload/download from the central server at Building 24. The existing Johnson Control system shall have the capability to load manage the new DDC system.

Provide sufficient quantity of digital controllers to perform all climate control, energy management, and alarm functions. All material used shall be currently in production.

In the event Camp Lejeune Public Works decides to carry out (on their own) any of the requirements of this paragraph, the contractor shall be free from said requirements.

The SCIF area ambient conditions shall be monitored continuously for overheat and extreme humidity conditions. In addition to normal alarm reporting, alarm signals shall be sent to user-designated telephone numbers of pertinent base personnel.

Provide electronic controls for remote, terminal HVAC equipment.
The entire DDC system shall be designed in accordance with the *EMCS Equipment and Points Nomenclature for Camp Lejeune* (included in Part 6 Attachments). UFGS specification 23 09 23.13 20 BACnet Direct Digital Control Systems for HVAC shall be used.

In addition, the following requirements shall be met for the facilities:
Provide a complete Direct Digital Control (DDC) system for the facility's HVAC systems. The DDC system shall be accessible from the Internet. Provide a front-end web-connected CPU or server. If a CPU is used, mount it in a locked, power-ventilated cabinet adjacent to the building front-end control panel(s). Provide the CPU or server with a battery backup UPS device. Locate UPS devices in a separate locked, power-ventilated cabinet. Locate all front-end DDC equipment in a clean, temperaturecontrolled, computer friendly environment. All DDC controllers, CPU's, servers, workstations, andinterface devices provided shall comply with and communicate using the ASHRAE Standard 135-2004, BACnet Protocol for Building Automation and Control Networks. The DDC system shall use BACnet objects and properties for all physical inputs and outputs, and BACnet read and write services for all network communications and device-to-device algorithms. Coordinate the BACnet network and device addressing with the Government BAS owner to ensure unique addresses. Provide BACnet Product Information Conformance Statements (PICS) for each DDC controller and BACnet device.

The controls sub-contractor for this project shall be regularly engaged in the design and installation of BACnet DDC systems (for building HVAC systems) similar to the size and scope of this project, shall have been a representative of the proposed control system manufacturer for a minimum of two years, have a staffed office within a 50-mile radius of the project location, and shall have performed design and installation of DDC systems for a minimum of 5 years. The controls sub-contractor shall ensure that their installing electricians have a copy of, read, and understand the mechanical sheets of the contract's design construction drawings, in addition to the control drawings prepared by the subcontractor. Provide the DDC programming and graphics using Standard English units of measure, not metric.

The control system shall be completely electric/electronic, no pneumatics.

The Design drawings shall include English sequences of operation that explicitly describe all control actions and Process and Instrumentation Diagrams that include control loops drawn in accordance with ANSI/ISA standard 5.1 2009.

The Controls sub-contractor exclusively shall:

Provide DDC programming to view, modify, alarm, trend, schedule, and override device parameters via

direct connection, and remotely via telephone line or LAN connection. Provide DDC programming routines in simple, easy-to follow logic. Provide detailed text comments describing each routine.

Provide each routine screen with its applicable as-built written sequence of operation.
Design control drawings shall include the following:

1. Detailed control system scope-of-work and installation notes describing the various components that will be provided (controllers, sensors, valves, dampers, etc.).

2. A diagram of the control system communication architecture, including network and device addressing.

3. Control valve and control damper schedules, including actuators and linkages.
4. DDC point schedule including point description, point type (BI, BO,
AI, or AO), alarm requirements, trend requirements, and additional information such as type of sensor, location, etc.

5. A detailed control diagram for each piece of HVAC equipment receiving
DDC. Diagrams shall show all related control components in their respective locations, valve and damper normal positions, fluid flow directions, and point types (BI, BO, AI, or AO).

6. A detailed written sequence of operation for each piece of HVAC equipment. Fully describe every operating routine (occupied operation, night setbacks, optimal start, etc.).

7. Show floor plans in the DDC graphics to scale. Where feasible, use the project's AutoCAD design drawings, purged of extraneous detail. Each piece of HVAC equipment shall be controlled by the DDC. Do not provide hard-wire interlocks between fans or pumps. Provide software interlocks instead. However, freeze protection thermostats, duct smoke detectors, and other safety type devices shall be hard-wire interlocked with their associated piece of HVAC equipment.

The following are a continuation of controls requirement that are not the exclusive responsibility of the controls sub-contractor:

Provide each piece of HVAC equipment with a hand-off-auto switch. The hand position shall energize the equipment directly under all conditions except activation of a freeze protection thermostat, duct smoke detector, or other safety type device. Ensure safety conditions also de-energize equipment in the auto position. Where feasible, provide air handlers and terminal units with discharge/supply air temperature sensors.

Provide control routines to automatically start back-up pumps (or other HVAC equipment) if the primary device fails. Rotate primary and back-up HVAC equipment monthly with a lead/lag control routine. Start/stop pumps via the DDC, not the chiller controller. Provide meters monitored by the DDC on the building's incoming propane, steam, condensate, water, and electric utilities. Set up trend reports to record data daily and store values in the front-end DDC computer. Provide flow rate meters monitored by the DDC for central hot and chilled water flows and central air handling unit air flows. When not used for direct control, provide wall mounted carbon dioxide and relative humidity sensors in strategic occupied spaces for monitoring purposes.

Provide hot water and chilled water valve actuators that fail open to the coil via a spring return. Provide each actuator with a self-locking male/female quick-connect type plug in the wiring serving each valve operator, for emergency use, to allow manually disconnecting power to the device, sending it to its fail position (without disrupting any other unit control). Locate each plug exposed in plain view. Provide chilled water control valve actuators and linkages that can be easily and fully insulated and vapor sealed at the valve connection.

Provide alarms for the DDC points. Provide point cross-referencing, time delays, and differentials to

prevent nuisance alarms. Analyze the alarms after the system is in operation and make additional adjustments to reduce/eliminate nuisance alarms. Trend all possible data points. Where possible, provide trends based on change-of-value for sensor readings, motor statuses, and actuator positions. Once the trend buffer is full, the oldest data will be purged from the list when new data is added. Store the maximum amount of data feasible. Provide trend reports for each DDC point after the system has been in operation and collected its buffer of data points.

Analyze the trends for anomalies, inconsistencies, and operating problems such as equipment running when it is not supposed to, valve hunting, inability to maintain set point, and incorrect start-up or shutdown sequences. The final DDC system Operation & Maintenance manuals shall include as-built drawings of the DDC communication wiring in the building showing the exact installed configuration/routing of the communication wiring daisy chain, including LAN's, switches, routers, and addressing exactly as installed.

Provide at least one registered copy (on mfr's original CD) of the control system software. If a hardware key is required, provide the manufacturer's largest capacity "master" key, allowing full access to the maximum number of controllers. Provide a minimum of six additional "technician level" hardware keys for distribution among the naval base mechanics and their laptop computers. If the control manufacturer uses software keys or registered "seats" instead of hardware keys, provide a minimum of six registered software seats, in lieu of keys. Regardless of the control manufacturer and its software license protection method, the Government shall receive the manufacturer's complete software, at least one full-access capability, and at least six limited-access capabilities.

For the DDC system provided under this contract, include at no additional cost to the Government, all firmware and system software upgrades (including patches and updates) as they become commercially available for a minimum of two years starting from contract acceptance. In the submitted control system O&M manuals, provide an itemized list of the firmware and system software. Include original release dates, version numbers, part numbers and serial numbers, and beginning and ending warranty dates. Provide a statement that firmware and system software upgrades shall be provided without cost during the two-year period. Provide an additional statement that the manufacturer's telephone technical support shall be provided without cost for five years from contract acceptance. The control system manufacturer shall provide toll-free telephone technical support at no additional cost to the Government for a minimum of five years from contract acceptance. Technical support shall be furnished by highly experienced service technicians of the controls manufacturer, and be available during normal weekday working hours. Include the toll-free technical support telephone number in the contract's control submittals. Absence of toll-free post-acceptance telephone technical support shall be sufficient reason for disapproval of a proposed control system manufacturer.

Provide a PC workstation in the Dining Facility manager's office.

The point-of contact for existing EMCS systems at MCB Camp Lejeune is:
Public Works Division, Kyle Brown, Telephone: (910) 340-8249.

D3070 SYSTEMS TESTING AND BALANCING

Provide complete Testing and Balancing (TAB) of all air and water distribution systems and HVAC equipment.

D307001 WATER SIDE TESTING & BALANCING – HEATING & COOLING

Refer to paragraph D3070.

D307002 AIR SIDE TESTING & BALANCING – HEATING, COOLING &

EXHAUST

Refer to paragraph D3070.

D307003 HVAC COMMISSIONING

Provide commissioning for all HVAC systems. Coordinate with the HVAC commissioning requirements of section 01 45 00.05 20, section 01 33 29, and the commissioning requirements of LEED v2.2. Provide technical oversight acceptance testing as identified by NAVFAC Engineering & Construction Bulletin ECB issue 2008-03 dated 9/25/08, attached in the Part 6 of this RFP package. Provide the items in checklist under the table column identified as “Ktr” The table under elements identify the items to be performed. A checklist shall be generated to show compliance, dated, and initialed by the Contractor and verified by the Contracting Officer when the work has been completed with the ECB. Apply those items under elements that are applicable.

D3090 OTHER HVAC SYSTEMS AND EQUIPMENT

D309001 GENERAL CONSTRUCTION ITEMS

Comply with UFC 4-010-01, DOD Minimum Antiterrorism Standards for Buildings.

Provide seismic restraints and Comply with all Anti-Terrorism and Force Protection Criteria.

Locate all air intake systems a minimum of 3 meters above ground elevation.

Include emergency shutoff switch in the control system that immediately shuts down all of the Building HVAC and galley systems.

All design and installation of HVAC and piping systems shall meet the seismic requirements of Seismic Design for Mechanical Systems dated May 2002, attached in the Part 6 of this RFP package.

D309090 OTHER SPECIAL MECHANICAL SYSTEMS

Provide energy (enthalpy) type energy recovery wheels (heat wheels) recovery system(s) for the 100% outside air ventilation system air- handling unit(s). The energy recovery system(s) shall use facility exhaust air to precondition the 100% outside ventilation air. In the event of a failure of the heat recovery wheel, the air handling unit shall be sized and capable of providing all required cooling, dehumidification, reheat, heating, etc.

Building Air Tightness: Provide a building envelope continuous air sealing barrier to reduce infiltration. Perform pressure test on completed construction to verify building envelope air tightness is .25 cfm/ft2 of envelope area at 0.3 in wg (75Pa) or less.

Perform thermography on completed construction to verify the envelope integrity.

Building Envelope Sealing Performance Requirement: Design and construct the building envelope for with a continuous air seal barrier to control air leakage into, or out of, the conditioned space. Clearly identify all air barrier components of each envelope assembly on construction documents and detail the joints, interconnections and penetrations of the air barrier components. Clearly identify the boundary limits of the building air barriers, and of the zone or zones to be tested for building air tightness on the drawings. Trace a continuous plane of air-tightness throughout the building envelope and make flexible and seal all joints. The air seal barrier material(s) must have an air permeance not to exceed 0.004 cfm / sf at 0.3” wg [0.02 L/s.m2 @ 75 Pa] when tested in accordance with ASTM E

2178. Join and seal the air barrier material of each assembly in a flexible manner to the air barrier material of adjacent assemblies, allowing for the relative movement of these assemblies and components. Support the air seal barrier so as to withstand the maximum positive and negative air pressure to be placed on the building without displacement, or damage, and transfer the load to the structure. Seal all penetrations of the air seal barrier. If any unavoidable penetrations of the air barrier by electrical boxes, plumbing fixture boxes, and other assemblies are not airtight, make them airtight by sealing the assembly and the interface between the assembly and the air barrier or by extending the air barrier over the assembly. The air seal barrier must be durable to last the anticipated service life of the assembly. Do not install lighting fixtures with ventilation holes through the air barrier.

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

Damper and control to close all ventilation or make-up air intakes and exhausts, atrium smoke exhausts and intakes, etc when leakage can occur during inactive periods. Compartmentalize crawl spaces under buildings by providing airtight vestibules at building access points, if accessed from exterior. Compartmentalize spaces under negative pressure such as boiler/mechanical rooms and provide make-up air for combustion.

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

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

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

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

SYSTEM DESCRIPTION

Provide an integrated fire alarm, mass notification, and suppression system capable of notifying building occupants and controlling any fire that may start inside the facility.

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. All equipment shall be installed per 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 "shall".

All Design Documents, (i.e. Building Code/Life Safety Analysis, plans, specifications, and calculations) developed for Section D40 shall 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 shall be prepared by, or under the direct supervision of a NICET engineering technician as specified below. NICET engineering technicians shall hold a current certification as an engineering technician in the field of Fire Protection Engineering Technology with the minimum Level of certification in the appropriate subfield as specified in UFC 3-600-01, UFC 3-600-10N, and UFC 4-021-01.

Provide training for the active systems consisting of two (2) eight (8)-hour sessions to accommodate both shifts of the base fire department and allow for rescheduling for unforeseen fire department responses.

D4010 FIRE ALARM AND DETECTION SYSTEMS

Provide an integrated fire alarm, mass notification and public address systems capable of notifying building occupants inside the facility. The combination fire alarm and mass notification system shall be designed and installed in accordance with UFC 3-600-01, UFC 3-600-10N, and UFC 4-021-01. Provide a complete, electrically supervised, addressable intelligent, manual and automatic, annunciated fire alarm and detection system throughout the facility. The system shall be a voice evacuation type system and shall also serve as a mass notification system. These integrated systems shall be capable of notifying building occupants by means of tones, strobes, prerecorded and live voice announcements. The fire reporting portion of the system shall be compatible with the existing base fire reporting system. The fire alarm system shall include manual stations, system smoke detectors, duct smoke detectors, audio/visual alarms, and electrical supervision of all sprinkler system alarm and supervisory devices.

The fire alarm control panel shall be capable of handling a minimum of 500 individually identified sensors within the main control panel. Provide Class A Notification Appliance Circuits and Class A Signaling Line Circuits.

Manual pull stations shall be semi-flush.

Provide a remote annunciator located as directed by the contracting officer.

D4020 FIRE SUPPRESSION WATER SUPPLY AND EQUIPMENT

Hydrant 5-262-12 was static and hydrants 5-260-12 and 5-259-12 were flowing. Base hydraulic calculations on a static pressure of 58 psig (gauge) with 1680 gpm available at a residual pressure of 46 psig (gauge) at the junction of the water distribution at Sneads Ferry Road.

The incoming sprinkler service shall be provided with a reduced pressure principle backflow preventer (RPZ).

D4040 SPRINKLER SYSTEMS

Provide wet pipe automatic sprinkler protection to provide complete coverage throughout the facility. Sprinkler system designs and installations shall be in accordance with UFC 3-600-01 and 03-600-10N.

For light hazard areas the sprinkler rate of application shall be 0.10 gpm/ft^2 over an area of 3,000 ft^2 with hose stream allowance of 250 gpm.

For ordinary hazard areas the sprinkler rate of application shall be 0.15 gpm/ft^2 over an area of 3,000 ft^2 with hose stream allowance of 500 gpm.

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

Design area reduction for use of quick-response sprinklers allowed when permitted per NFPA 13. Design area shall be increased 30% for sloped ceilings when required by NFPA 13.

Provide corrosion resistant sprinklers where required by NFPA 13

Provide dry pendent sprinklers for the protection of walk-in refrigerators and freezers.

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, Conduits, Feeder and Branch Circuits, Lighting and Branch Wiring, Communications, Motor Control Equipment, Lighting and Branch Wiring, Security and Alarm Systems, Emergency Generator, Emergency Lighting and Power, Grounding, Lightning Protection, Building Photovoltaic System, including accessories and devices as necessary and required for a complete and usable system. Power must also be provided to an exterior storage building. This section covers installations out to the building 5 foot (1.5 meter) line.

The interior distribution system shall consist of insulated copper 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. All equipment shall be installed per 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 "shall".

D5010 ELECTRICAL SERVICE AND DISTRIBUTION

D501001 MAIN TRANSFORMERS

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

D501002 SERVICE ENTRANCE EQUIPMENT

All service into the facility shall be underground.

Provide switchboard as service equipment for services rated 1200 amps and higher. Provide a main distribution panel as service equipment for services rated below 1200 amps. Provide switchboard with digital metering.

D501003 INTERIOR DISTRIBUTION TRANSFORMERS

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

D501004 PANELBOARDS

Provide distribution and branch circuit panelboards with bolt-on type breakers throughout to serve loads as required. Through-feed, or split bus, panelboards are not allowed.

D501005 ENCLOSED CIRCUIT BREAKERS

Provide enclosed circuit breakers as required.

D501006 MOTOR CONTROL CENTERS

Provide motor control centers, individual motor starters with disconnect switches, combination motor starters, variable speed drives, reduced voltage controllers, manual motor starters for motor controls as required by mechanical and food service equipment.

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 dedicated power connections to all ancillary office equipment such as printers, faxes, plotters, and shredders.

Provide dedicated circuits and connections for the following special outlets: commercial washer and dryer, food service equipment, Dock Leveler and Exterior Storage Building.

Provide power and control circuits/wiring for emergency gas shut off to kitchen equipment as required, including remote emergency push buttons at kitchen exits.

D502001 BRANCH WIRING

All branch wiring shall be insulated copper conductors in conduit.

D502002 LIGHTING EQUIPMENT

Provide a complete lighting system consisting of exit and emergency lighting and area lighting consisting of fluorescent, and wall mounted sconces on exterior of building, including switches and automatic controls, including occupancy sensors, automatic lighting shutoff systems and dimming systems.

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 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, outlet boxes, telephone jacks, data jacks and cover plates.

Provide 2 telephone jacks in the Fire Sprinkler room, 1 telephone jack in the Mechanical room and 1 telephone jack in the kitchen that is dedicated to the grease pit system.

All equipment and installation shall be in accordance with MCB Camp Lejeune’s Telecommunication Standards, section 27 10 00 located in Part 5 (Prescriptive Specifications).

Designer of Record shall coordinate installation and termination of all interior telecommunication systems with MCB Camp Lejeune Base telephone (Inside Plant). Point of contact for inside plant is Steve Daigle @ (610) 451-9439.

D503002 PUBLIC ADDRESS SYSTEMS

Provide a Public Address system with speakers in all common spaces.

Interface the Public Address System with the Mass Notification System. Coordinate with SPAWAR. Point of contact for SPAWAR is Adam James @ (843) 218-4963.

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 shall include, but is not necessarily limited to, head end 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. Provide enough TV outlets in the dining areas to cover every sitting arrangement in the dining areas (360 degree coverage). Coordinate with customer for final number and arrangement of CATV outlets

D503005 SECURITY SYSTEMS

An Electronic Security System (ESS) is the integrated electronic system that encompasses one or more of the following subsystems; access control system (ACS), intrusion detection system (IDS), and closed circuit television (CCTV) systems for assessment of alarm conditions.

The ESS for this project shall consist of an IDS.

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

Intrusion Detection System (IDS) will be provided by SPAWAR under a separate contract. IDS will sense all exterior, perimeter doors. System shall have 90-minute battery back-up and annunciate both locally and at the Base Security office via a telephone dialer. System shall have entry/exit timer. Provide wall mounted keypad control at 2 locations. Coordinate with SPAWAR. The point of contact for SPAWAR is Adam James @ (843) 218-4963.

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.

Conduits, cable trays and busways that penetrate fire-rated walls, fire-rated partitions, or fir-rated floors shall be firestopped in accordance with Section C10, *Interior Construction*.

D509002 EMERGENCY LIGHTING AND POWER

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

Provide an emergency generator for power backup. Size engine-generator set to backup the entire building loads. The generator shall be capable of providing emergency power continuously for a min

period of 24 hours.

D509003 GROUNDING SYSTEMS

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

D509004 LIGHTNING PROTECTION

Provide a complete lightning protection system with a UL Lightning Protection Inspection Certificate certified to UL 96A, including, but not necessarily limited to, strike termination devices, conductors, ground terminals, interconnecting conductors, surge suppression devices, and other connectors and fittings required for a complete and usable system. The system shall meet the Master Label requirements. Lightning Protection Systems shall not void the roof warranty.

D509006 ENERGY MANAGEMENT CONTROL SYSTEM

Provide power wiring and connections as required for all systems and equipment including building automations systems and solar domestic Hot water system. Coordinate connection requirements with switchgear and pad mounted transformer kWh metering.

D509007 BUILDING PHOTOVOLTAIC SYSTEM

Provide Building Integrated or Mounted Photovoltaic (BIMPV) System on roof. Provide power wiring and connections as required for all systems and equipment including EMS. Coordinate connection requirements with switchgear and pad mounted transformer kWh metering.

Contact NAVFAC MidLant for PV specification source file.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

E10 EQUIPMENT

GENERAL SYSTEMS REQUIREMENTS

E1010 COMMERCIAL EQUIPMENT

The contractor shall obtain the services of equipment specialists to specify commercial kitchen equipment. Equipment specialists shall not have any affiliation with the product specified.

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

E1030 VEHICULAR EQUIPMENT

Loading docks shall be provided with dock bumpers, truck-trailer restraining devices, and dock levelers.

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 shall remain in control of the Government until such time as the Contractor is ready to install. Testing requirements of Government Furnished equipment shall be the responsibility of the Contractor and shall follow the same guidelines as though the Contractor had provided the equipment.

E1090 OTHER EQUIPMENT

E109002 FOOD SERVICE EQUIPMENT

Provide food service equipment as required for a commercial kitchen to serve 2032 persons with a menu to include full breakfast, lunch and dinner as well as fast food with walk-up facilities. The contractors food service consultant will need to work closely with the Marine Corps East Region Food Service Manager and the MCAS New River Food Service Manager during the Concept Design Workshop described in the Part 2 General Requirements portion of this RFP.

Provide the food service equipment in the Food Service Equipment List in Part 6 – Attachments of this RFP that is listed as MILCON as part of the base bid. (for all kitchen equipment tagged as CEQ see section E20 of this RFP)

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

E20 FURNISHINGS

SYSTEM DESCRIPTION

Furnishings shall include fixed furnishings as part of the Structural Interior Design (SID) and the design and documentation of the Furniture, Fixtures, and Equipment (FF&E) package.

The design and documentation of the SID and FF&E package shall be funded as part of the construction contract base bid. The purchase and installation of the FF&E package shall be funded separately as part of Collateral Equipment.

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, movable kitchen equipment, and other miscellaneous items specified by the Activity to support facility functions. A separate Movable Kitchen Equipment package shall be developed as a sub-package to the FF&E. This sub-package shall be identified as a separate line item on the Bid Schedule. To ensure kitchen design continuity, the Movable Kitchen Equipment package is to be bid in conjunction with the fixed kitchen equipment. Refer to Part 6 Attachments for the kitchen equipment list. Movable kitchen equipment items are indicated as Collateral Equipment (CEQ).

Fixed furnishings (items that are fixed to the structure), specialty equipment, such as fixed (built-in and/or hard plumbed) steam kettles, scullery, grease traps, overhead vent, walk-in room refrigerators and freezers, drying cages, lockers, security cameras, marker boards, blinds/shades are part of the construction contract base bid. Refer to Part 6 Attachments for the kitchen equipment list. Fixed kitchen equipment items are indicated as MILCON.

Collateral Equipment is estimated in the following amount: $1,300,000.00 (furniture is estimated at $300,000.00 and movable kitchen equipment at $1,000,000.00). It is the Government’s intent to have the furniture and movable kitchen equipment purchased and installed by contractor. The estimate above includes the contractor’s Handling and Administration Rate (HAR).

GENERAL SYSTEMS REQUIREMENTS

Design and provide fixed and movable furnishings for all areas as developed during Activity programming and as indicated in the Room Requirements (refer to Part 3 Section 5 of this RFP). Design a complete FF&E package and prepare supporting plans and procurement data. FF&E items identified in this RFP are to be used as a guideline to assist in establishing the minimum facility requirements and do not relieve the Contractor's Interior Designer from developing a complete design package that incorporates ALL of the Activities FF&E requirements. Design per specific UFC (i.e. Dining Hall, BEQ, etc) and in conjunction with UFC 03-120-10, Interior Design.

The contractor shall have 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 SID and the FF&E Package and participate in all design charrettes and review meetings to develop the building design and floor plan. When kitchen equipment, shop or specialty equipment is required in the project, the contractor shall obtain services of equipment specialists to specify the kitchen equipment, shop, or specialty equipment. The Contractor's Interior Designer and any Specialists shall 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.

All fixed and movable furnishings selections shall be closely coordinated with Parts 3 and 4 Sections C10, Interior Construction, and C30 and E10 of this RFP. The FF&E package shall be fully integrated with the building systems and finishes.

The Contractor's Interior Designer shall be responsible for designing and providing specifications for procurement of all FF&E, to include delivery and installation, and NC tax (7.75%) for the facilities built under this contract as directed by the NAVFAC Interior Designer. FF&E specifications shall be based on NAVSUP Blanket Purchase Agreements (BPA's), GSA schedules, and other Federal contracts and complying with priorities found in FAR Part 8.404. A list of current BPA contract holders is located in Part 6 of this RFP.

The FF&E package shall be fully integrated into the design and construction schedule for the building.

INTERIOR DESIGN SUBMITTAL AND MEETING REQUIREMENTS

STRUCTURAL INTERIOR DESIGN (SID)

The SID submittal process shall begin following the award of the RFP. The SID submittal shall include Interior Design programming documents, FF&E 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 UFGS 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 shall meet with the Activity and Base Property for Marine Corps projects to develop the Interior Design SID programming documents, which will include a preliminary Furniture and Equipment Plan and the FF&E Summary List. The Contractor's Interior Designer shall provide in-depth room by room interviews to confirm Activity requirements for the new facility(s). These interviews shall occur at the Activity's current location, if possible, to include building walk-thru(s). Minutes of this meeting shall be submitted to the NAVFAC Interior Designer within 7 days

b. Design Development (35%-50%) Submittal: The Contractor's Interior Designer shall provide a conceptual Finish Schedule, proposing finish materials to be used in all spaces. The Furniture and Equipment Plan and FF&E Summary List should be further developed and included in this submittal.

c. SID "Over the Shoulder" Review: Prior to the Pre-Final (100%) Submittal, the Contractor's Interior Designer shall 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 shall 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 Mid Atlantic’s office in Norfolk.

d. Pre-Final (100%) Submittal: The Contractor's Interior Designer shall 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 shall be documented and submitted in a 16"x20" presentation board format to the NAVFAC Project Manager. In addition, the submittal shall include an updated Furniture and Equipment Plan, Finish Schedule, Floor Finish Plan, and Finish Legend for review and approval. The Contractor’s Interior Designer shall provide at least two sketches to show a perspective of the major areas of the interior. The sketches should not be elaborate but must show the proposed form and massing, colors to be used and an indication of materials used.

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

SID CONSTRUCTION SUBMITTALS

No substitutions during construction phase shall be made to the SID finishes once they have been approved by NAVFAC during the design phase. In the event that revisions may be 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.

INTERIOR PHOTOGRAPHY SUBMITTAL

Upon completion of the FF&E installation, the contractor shall provide professional photography of the completed interior. The photographer must be in the business of specializing in architectural and interior photography. The submittal shall be a minimum of 6 photos. "Before" and "After" photos are required for all renovation projects. Permission for publishing and using the photos by NAVFAC is required. Images to be submitted on a CD as a JPEG or PDF with a resolution of no less than 300 dpi as well as 8x10 matte photographs. The photographs shall be taken prior to occupancy and staged with accessories as needed. Additional lighting may be needed to ensure quality images.

FIXTURES, FURNISHINGS AND EQUIPMENT (FF&E)

The FF&E process shall begin approximately with the 50% design submittal. The submittals shall include fixtures, furnishings, and equipment specifications in accordance with the Activity requirements to produce an optimally functional facility. FF&E are all items that are not fixed to the structure, but are fully integrated with the building systems and finishes. Refer to RFP Part 4 Section Z10 General Performance Technical Specification and Part 2 UFGS Section 01 33 1-.05 20, Design Submittal Procedures.

Develop design as described and in accordance with the Activity requirements. Include in the design all loose furnishings required to produce an optimum functional facility, consistent with quality commercial design. This project also includes the preparation of specific detailed information for each selected item. Each submittal shall demonstrate interaction thoroughly with the Activity requirements and complete coordination with the facility design and the SID. Five (5) submittals will be required; (1) for the NAVFAC Project Manager, (3) for the FEAD/ROICC and Base Property, and (1) for the Activity.

For all projects, including fast track projects, the contractor shall be responsible for sufficiently scheduling all SID/FF&E submittals early enough to obtain the required government approvals, and meet all ordering and installation lead times to complete the project by the contract completion date.

These are minimum requirements and the Contractor shall be prepared to provide any/all additional meetings and submittals that may be necessary to support the Interior Design effort/FF&E coordination.

Provide the following FF&E meetings and submittals;

a. FF&E Requirements (Interior Design Orientation) Meeting: This meeting shall occur upon completion of Design Development (or approximately 50%), at NAVFAC Mid Atlantic office in Norfolk prior to the development of the FF&E package. The NAVFAC Interior Designer will provide the Contractor's Interior Designer a sample format of the FF&E submittal, review the Best Value Determination (BVD) process, and discuss Blanket Purchase Agreement (BPAs), GSA or other mandatory sources to consider. The FF&E

Summary List and a preliminary Cost Estimate shall be submitted with in 21 days to the NAVFAC Interior Designer to review with Base Property for Marine Corps Projects. Minutes of this meeting shall be submitted to the NAVFAC Interior Designer within 7 business days.

b. FF&E "Over the Shoulder" Review: Prior to the Preliminary FF&E Submittal the Contractor's Interior Designer shall meet with the NAVFAC Interior Designer for an "over-the-shoulder" review to present preliminary FF&E options. These can be presented in a "loose" format for preliminary approval prior to the Activity presentation. The "over-the-shoulder" review meeting is to be held at NAVFAC Mid Atlantic Norfolk office.

c. FF&E Concept Presentation: The Contractor's Interior Designer shall present the NAVFAC approved preliminary FF&E package to the Activity for approval. This presentation shall include loose format samples and catalog cuts. Sample boards are not required.

d. Best Value Analysis (BVA), "Over the Shoulder Review": Prior to issuing the BVA, the Contractor's Interior Designer shall meet with the NAVFAC Interior Designer for an "over-the-shoulder" review of the solicitation package. BVA Solicitation to include the following:

1. Copy of the BVA cover letter.

2. BVA Solicitation form & Questionnaire

3. Technical Specification to establish minimum acceptable FF&E requirements

4. Room and Typicals

5. Furniture Plans with Legends (PDF format)

e. Preliminary BVA Submittal - The Contractor's Interior Designer shall submit one (1) copy of the Preliminary BVA package to the NAVFAC Interior Designer and one (1) copy to Base Property for Marine Corps projects. This submittal shall be in binder format and will include the following:

1. Cover Title Page (project name, project #, submittal date, submittal title)

2. Table of Contents

3. Point of Contact List

4. Narrative of Interior Designer Objectives

5. Copy of all information sent to bidders and documentation that all required sources were contacted.

6. BVA Spreadsheet

7. Solicitation Forms submitted by each bidder (cut sheets/highlighted pricing sheets/technical specifications, pricing, dealer and manufacturer qualification for each product showing that products meets all requirements.)

8. Response from UNICOR

f. Preliminary FF&E Submittal: The Preliminary FF&E submittal shall be due at pre-final (100%). It shall be presented to the Activity and NAVFAC Interior Designer. Submit the following in a 3-ring binder (with the exception of the 16x20 color boards) for both Activity and NAVFAC Interior Designer review and approval:

1. Cover Title Page (project name, project #, submittal date, submittal title)

2. FF&E list (Cost Summary)

3. Furniture placement plans coded to the FF& list and furnishings specifications

4. Specifications for furniture, furnishings, etc.

5. Catalog cuts and finish samples for all specified items

6. 16x20 inch color boards of furniture/furnishings and finishes specified for Activity presentation to indicate overall design intent

7. [8x10 color photographs of the color boards]

g. Final FF&E Submittal: The Contractor's Interior Designer shall submit the Final FF&E Package within 30 calendar days following the receipt of review comments on the preliminary FF&E submittal. The Final submittal shall incorporate the following:

1. Cover Title Page (project name, project #, submittal date, submittal title)

2. Table of Contents

3. Manufacturer Contact List

4. Procurement Data Sheets for each product indicating final finish and fabric selections

5. Copy of Final Quote on Letterhead from the vendor determined to be the Best Value.

6. Best Value Determination Guideline sheets (completed and signed by the Contactor's Interior Designer)

7. CD copy of the final FF&E binder.

8. Final Finish Selections and Memo Samples for the FF&E submitted in 8x10 binder format, using heavy-duty plastic sheet protectors

FF&E CONSTRUCTION SUBMITTALS

No substitutions during shall be made to the FF&E once they have been approved by NAVFAC during the design phase. In the event that revisions may be 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.

SD-10 Operation and Maintenance Data

List Operation and Maintenance Manuals for seating, systems furniture and keyboard trays.

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. Each submittal must demonstrate complete coordination with the facility design and with the package for movable furnishings.

E201001 FIXED ARTWORK

As required, provide wall mosaic, painted mural, graphics and/or logo of activity in appropriate locations.

E201002 WINDOW TREATMENTS

All windows and other glazed openings to the exterior of the building shall be provided with [horizontal blinds] [solar shading system] [manually or electrically operated double-roller sunscreen and room darkening shades] and are considered SID and are funded as part of the construction project.

Soft window treatments, such as draperies, are considered FF&E and shall be included in the FF&E package, as required.

E201003 FIXED SEATING AND TABLES

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

Provide locker room benches.

Provide dining booths fixed dining tables and chairs

E201004 INTERIOR LANDSCAPE (FIXED)

E2020 MOVABLE FURNISHINGS

The design and documentation of the FF&E package (to include the Movable Kitchen Equipment package) shall be funded as part of the construction contract base bid. The purchase and installation of the FF&E package shall be funded separately as part of Collateral Equipment. The purchase and installation coordination of FF&E is a **PLANNED MODIFICATION** to the contract and funded separately as part of Collateral Equipment. The specific process is outlined in PTS E20 in Part 4 of this RFP. If a Collateral Equipment list is provided within this RFP, the costs associated with the purchase and installation of these items are NOT to be included in the base bid. The estimated Collateral Equipment cost is provided for information purposes only. The Contractor only needs to propose the Handling and Administrative Rate (HAR)

Design and provide a FF&E package in accordance with UFC 03-120-10, *Interior Design,* and other portions of this RFP for all areas as developed during Activity programming to provide a fully usable and complete facility. FF&E may also include specialty items specified by the Activity. The independent equipment specialists and the Contractor's Interior Designer are responsible for incorporating these into the FF&E package.

The FF&E Package must include shipping, freight, and handling, and professional installation, project management, HAR, applicable sales tax. A Best Value Determination shall be performed . Documentation shall be provided to the Government with the final FF&E package. Specific Documentation is indicated in Part 4 of the RFP. The BVD Statement shall be completed and signed by the contractor's interior designer. A sample BVD form and instructions is provided in Part 6 of this RFP.

The Contractor, as a planned modification, shall be authorized by the Government Contracting Officer to procure all furniture/furnishings in the approved final FF&E package using predominately negotiated Federal contracts as directed by the Contracting Officer and the NAVFAC Interior Designer. When the modification for turnkey furniture procurement is exercised, the Contractor's proposed Handling and Administrative Rate (HAR) shall not exceed 5% of the total cost of the FF&E, shipping, freight, handling, and installation and NC tax. The HAR includes all of the prime contractor's effort related to the storage, coordination, handling and administration of subcontractors, and all other associated costs and profit for the procurement of FF&E. No other charges, fees, or markups will be authorized. The contractor shall establish and submit a fixed percentage figure, for the administration effort of this modification (HAR), with the initial project proposal as part of the contractor's Pricing Schedule.

E202001 MOVABLE ARTWORK

Provide movable artwork as required.

E202002 MODULAR PREFABRICATED FURNITURE

Provide Workstation systems product or modular freestanding workstations as required. Provide at a minimum, an articulating keyboard tray with left or right handed mouse extension for each computer location.

E202003 FREESTANDING FURNITURE AND FILES

Provide ergonomic task seating, lounge, reception and guest seating, storage and filing, tables, as required.

E202004 RUGS & ACCESSORIES

Provide area rugs, lamps, soft window treatments (drapery and hardware) interior landscaping, and other decorative items as required.

E202005 MULTIPLE SEATING (MOVABLE)

E202006 INTERIOR LANDSCAPING (MOVABLE)

Provide interior landscaping (planters, site furnishings, etc.) as required.

E202090 OTHER MOVABLE FURNISHINGS

Provide waste receptacles, recycling containers, fire extinguishers, clocks, literature racks, washers, dryers and other appliances as required.

Do not include waste receptacles or clocks in Marine Corps projects.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

G10 SITE PREPARATION

SYSTEM DESCRIPTION

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

GENERAL SYSTEM REQUIREMENTS

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

A topographic surveys of the existing sites have been performed and are included in Part 6. The topographic surveys have been provided to show the location of existing facilities, areas of new work required by this RFP and the character of the sites. Prior to starting work, physically verify the location of all existing utilities and obtain all additional survey data required to provide a quality final design. The existence, size and/or location of the utilities are not guaranteed by the surveys provided. The Contractor shall verify the location of all utilities prior to construction. Electronic files of the topographic surveys will be provided to the Contractor only after award of the contract.

Subsurface soil information, including geotechnical reports are included in other portions of this RFP.

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

Any geotechnical report included with site investigation data is provided only to better convey data (boring logs, testing, etc.) or to document observed site conditions. The assumptions, analysis, and recommendations of the accompanying report were developed for preliminary planning purposes only and may not be based upon present project requirements. Requirements stated in Parts 3 and 4 of the RFP take precedence over any content of any included geotechnical report.

The Contractor is required to retain a geotechnical engineer experienced and licensed in the geographic region of the project to interpret the provided data as related to his design concept and develop requirements for bidding. Additional requirements for the geotechnical design of this project are provided elsewhere in this RFP.

Minor variations between borings should be anticipated. The Contractor shall bear all costs associated with the site preparation and actual foundation except as allowed by the Contract Clause FAR 52.236-2, "Differing Site Conditions". The Contractor's Geotechnical Engineer shall perform additional subsurface investigation as required to adequately determine all applicable geotechnical factors including the type and capacity of the project foundation(s). The Contractor's Geotechnical Engineer shall consider the provided information and any additional information obtained and prepare a report as described in other portions of this RFP.

Personnel under the supervision of a registered Professional Engineer shall provide inspection of excavations and soil/groundwater conditions throughout construction. The Engineer shall be responsible for performing pre-construction and periodic site visits throughout construction to assess site conditions. The Engineer, with the concurrence of the Contractor and the Contracting Officer, shall

update the excavation, sheeting, shoring and dewatering plans as construction progresses to reflect actual site conditions and shall 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 shall be available to meet with the Contracting Officer at any time throughout the contract duration. The Contractor shall bear all costs of the Engineer.

Unless otherwise noted, provide new facilities at the locations indicated on the drawings in another part of this RFP.

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

Identify and obtain all permits to comply with all federal, state, and local regulatory requirements associated with this work. The contractor shall submit a complete "Permits Record of Decision" (PROD) form with the first design submittal package. A blank PROD form can be obtained at the Download Tab of Part 6 of the NAVFAC Design-Build website at the following link http://www.wbdg.org/ndbm/Download/Download.html?Tab=Download. Contractor shall determine correct permit fees and pay said fees. Copies of all permits, permit applications, and the completed PROD form shall be forwarded to the Government's Civil Reviewer and Environmental Reviewer.

Jurisdictional tidal and non-tidal wetlands have been identified on the project sites. All tidal and non-tidal wetlands work shall be performed in accordance with the permits obtained as required by UFC 3-200-10N, *Civil Engineering*.

Coordinate and obtain the Resident Officer In Charge of Construction's (ROICC) 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.

G1010 SITE CLEARING

G101001 CLEARING

Preserve trees to the maximum extent possible.

The MCB Camp Lejeune Forestry Division will harvest marketable timber from the building sites within the construction limits prior to this project start-up. Coordinate with the Contracting Officer and notify the MCB Forestry Division immediately upon receiving approval of the final location of all project elements and establishment of the construction limits. Mark the clearing limits and allow a maximum of 120 days for the Forestry Division to harvest. All remaining timber on the project site, except as noted in Section G10 in Part 4 of this RFP, shall become the property of the Contractor and shall be removed from the project site and disposed of off station.

G101002 TREE REMOVAL

Remove and dispose of all remaining trees as required for project construction.

G101003 STUMP REMOVAL

Refer to Section G10 in Part 4 of this RFP for performance requirements associated with this work.

G101004 GRUBBING

Refer to Section G10 in Part 4 of this RFP for performance requirements associated with this work.

G101005 SELECTIVE THINNING

Refer to Section G10 in Part 4 of this RFP for performance requirements associated with this work.

G101006 DEBRIS DISPOSAL

All grubbing and clearing residue, demolished material, rubbish and debris generated by this project shall be hauled off-site and off station by the Contractor.

G1020 SITE DEMOLITION & RELOCATIONS

G102001 BUILDING MASS DEMOLITION

No Building demlition required at this project site.

G102002 ABOVEGROUND SITE DEMOLITION

Preserve the following aboveground site elements: All utilities and storm drainage elements serving existing facilities that are to remain unless new utilities and storm drainage facilities incorporate or replace them.

G102002 1.1 ABOVEGROUND STORAGE TANKS

An aboveground storage tank report is not provided to support this project.

Prior to starting work, conduct any additional testing that may be needed to provided a final design and comply with all applicable federal, regional, state and local regulations. Refer to 3-800-10N, *Environmental Engineering for Facility Construction*, for additional requirements and criteria.

G102003 UNDERGROUND SITE DEMOLITION

Preserve the following underground site elements: All existing utilities and storm drainage elements serving existing facilities that are to remain unless new utilities and storm drainage facilities incorporate or replace them.

Abandonment of utility systems shall be done in a manner that conforms to applicable codes and regulations, removes their presence from the ground surface and clearly indicates that they have been abandoned. Utilities shall not be abandoned in place underneath or within 10 feet (3.0 m) of any new facilities.

All conduits to be abandoned shall have wiring removed.

Remove existing utility structures to 3 feet (900 mm) below existing or new adjacent grade, whichever is greater. Break up bases to permit drainage. Fill with clean sand.

G102004 BUILDING RELOCATION

Relocate building elements as indicated on the drawings in another part of this RFP. Refer to Section F2020, “Hazardous Component Abatement” for requirements related to removal of hazardous components.

G1030 SITE EARTHWORK

G103001 GRADING

Finish floor elevations for new facilities shall be above the 100 year flood elevation. Provide elevations for mechanical/electrical equipment pads above the 100 year flood elevation. The finished floor elevation of the new buildings shall be a minimum 6-inches above the finished ground elevation surrounding the building.

G103002 COMMON EXCAVATION

Refer to Section G10 in Part 4 of this RFP for performance requirements associated with this work.

G103003 ROCK EXCAVATION

Blasting will not be permitted.

G103004 FILL & BORROW

Borrow and select fill shall come from the French Creek Borrow pit.

G103005 COMPACTION

Refer to Section G10 in Part 4 of this RFP for performance requirements associated with this work.

G103006 SOIL STABILIZATION

Provide soil stabilization using geosynthetics, such as geotextiles and geogrids, lime, cement, lime slurry, asphalt, or pressure grouting, designed to function as required by site conditions.

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. Where necessary, use the following techniques for slope stabilization: geogrids, riprap, or concrete.

G103008 SOIL TREATMENT

Treat the area around the entire foundation of each building for termite control in accordance with manufacturer's instructions.

G103009 SHORING

Refer to Section G10 in Part 4 of this RFP for performance requirements associated with this work.

G103010 TEMPORARY DEWATERING

Provide the name and certification of the North Carolina certified well driller being used. Also provide well construction and abandonment reports for submittal to the state. Comply with all North Carolina requirements and regulations.

G103011 TEMPORARY EROSION & SEDIMENT CONTROL

Construct temporary measures including but not limited to filter barriers, silt fence, inlet protection, culvert protection, construction entrance, dust suppressors, temporary seeding, and erosion control matting to reduce on-site erosion and off-site runoff and sedimentation. Refer to Section G10 in Part 4 of this RFP for performance requirements associated with this work.

G1040 HAZARDOUS WASTE REMEDIATION

G1040 1.1 EXCAVATION

Perform excavation of contaminated material in accordance with: Section 01 57 19.05 20, *Temporary Environmental Controls for Design-Build*.

All soil excavated within the contamination area may be re-used as backfill in the excavation where it was encountered if the soil is determined suitable for backfill as specified herein, unless it is saturated with petroleum (e.g. when the soil is squeezed, oil drips out). If the excavated soil is not suitable for backfill (cannot be compacted or does not meet the requirements of Section 31 23 00.00 20, "Excavation Fill"),

it shall be transported to the 'Soil Stockpile Area'. At the stockpile area the soil shall be tested and disposed of in accordance with the requirements specified herein. During excavation within the contamination area the contractor shall temporarily stockpile the excavated soil as close to the excavation as possible, but not so as to impede construction progress. The contractor shall be responsible for determining the location and size of the temporary stockpile within the contamination area. The contractor shall be responsible for determining the exact location of the soil stockpile area on the construction site. Therefore, except for an increase or decrease in tonnage of contaminated material, claim for additional compensation shall not be made regardless of the amount of effort or time required to handle or stockpile soil. The contractor shall take measures specified herein to prevent the contamination of adjacent areas at all stockpile locations and during earthwork operations.

If contaminants are suspected through odors or visual inspections during soil investigations, stop work immediately and contact the Contracting Officer.

G1040 1.2 STOCKPILED SOILS

For stockpiled soils, provide a minimum of one test for TPH, and one test for BTEX and TCLP. Soils that contain 50 ppm or more TPH, 10 ppm or more BTEX or fail the TCLP test are considered contaminated materials.

Contaminated stockpiled materials shall be disposed of in accordance with applicable federal, state and local regulations.

G1040 1.3 CLEAN FILL

Soils that are determined as clean fill via testing shall be backfilled and compacted in accordance with the requirements listed in this section.

G1040 1.4 SPILLS

[In the event of a spill or release of hazardous substances, pollutant, contaminant or oil, notify the Contracting Officer immediately. Containment/Control actions shall be taken immediately to minimize the effect of any spill or leak. Clean up shall be performed at the Contractor's expense in accordance with applicable federal, state and local regulations.

G1040 1.5 DISPOSAL

All waste materials shall become the property of the Contractor and shall be transported, disposed of or recycled in accordance with applicable federal, state and local regulations.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

G20 SITE IMPROVEMENTS

SYSTEM DESCRIPTION

The site improvements system consists of pavements and pavement related features, landscaping and other exterior site development work related to this project. Pavement design shall be performed by a licensed Professional Engineer familiar with conditions local to the project site.

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 site improvements in conformance with applicable requirements of the Uniform Federal Accessibility Standards.

Identify and obtain all permits to comply with all federal, state, and local regulatory requirements associated with this work. The contractor shall complete the "Permits Record of Decision" (PROD) form with the first design submittal package. A blank PROD form can be obtained at the Download Tab of Part 6 of the NAVFAC Design-Build website at the following link http://www.wbdg.org/ndbm/Download/Down_Additional.html?Section=AdditionalInfo . Contractor shall determine correct permit fees and pay said fees. Copies of all permits, permit applications, and the completed PROD form shall be forwarded to the Government's Civil Reviewer.

Provide improvements as required to conform to all applicable anti-terrorism and physical security requirements.

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. The design of pavements shall take into consideration the anticipated daily traffic over the life of the project (20 years) as well as the existing soil conditions at the site.

Provide roadways of bituminous pavement where indicated on the drawings in another part of this RFP. Gravel pavement may not be used.

Provide new roadway and other pavement sections as required by soil conditions and determined by Designer of Record. Minimum bituminous pavement section is 2" bituminous surface, 3” asphalt base on 8" aggregate base over a compacted sub-grade. Minimum PCC pavement section is 6" PCC on 4" aggregate base over a compacted sub-grade.

Provide other roadway improvements including bus stops, traffic signalization, markings, and signage, as required by MUTCD.

G201001 BASES & SUBBASES

The following materials will not be allowed for base or sub-base courses: bituminous concrete, sand-clay, or shell.

G201002 CURBS & GUTTERS

Provide curb and gutter to tie into adjacent facilities.

G201003 PAVED SURFACES

Recycled asphalt pavement material may be used for bituminous concrete pavement, as permitted by the SHS.

G201004 MARKING & SIGNAGE

Provide pavement markings including crosswalks, in accordance with NCDOT.

Provide signage to match existing.

Provide temporary pavement markings and signage throughout construction to meet phasing requirements indicated in the project program. Provide temporary signage in accordance with the MUTCD.

G201005 GUARDRAILS & BARRIERS

Provide wheelstops and bollards in accordance with the UFC 3-200-10N, *Civil Engineering*.

G201006 RESURFACING

Provide resurfacing of existing pavement by bituminous overlay.

G201090 OTHER ROADWAYS

G2020 PARKING LOTS

Provide parking for private motor vehicles (PMVs) as described in Part 3, Site Analysis. The design of pavements shall take into consideration the anticipated daily traffic over the life of the project (20 years) as well as the existing soil conditions at the site.

Provide parking lots of bituminous pavement. Gravel pavement may not be used.

Provide new parking and other pavement sections as required by soil conditions and determined by Designer of Record. Minimum bituminous pavement section is 2" bituminous surface on 8" aggregate base over a compacted sub-grade. Minimum PCC pavement section is 6" PCC on 4" aggregate base over a compacted sub-grade.

Provide other parking improvements including parking entrances for two-way traffic, motorcycle parking stalls, bicycle stalls, markings, signs.

Motorcycle parking stalls must be Concrete surfaced. In hot weather motorcycle stands will deform heat softened asphalt pavement. An overturned motorcycle may result in a fuel spill.

Provide handicapped parking in accordance with the Uniform Federal Accessibility Standards.

G202001 BASES & SUBBASES

Crushed concrete meeting specified gradation for aggregate base or sub-base courses may [not] be used.

G202002 CURBS & GUTTERS

Provide curb and gutter to tie into adjacent facilities, only when necessary. Minimize curb and gutter as much as possible in order to meet LID requirements.

G202003 PAVED SURFACES

Portland cement concrete shall have a minimum design flexural strength of 650 to 700 psi (4.48 to 4.83 MPa) in not more than 28 days.

Recycled asphalt pavement material may be used for bituminous. Concrete pavement (as permitted by the SHS).

G202004 MARKING & SIGNAGE

Provide permanent and temporary markings (pavement, curb and object), signage (regulatory, warning and guidance) and other traffic control devices as required to facilitate proper utilization of the parking areas.

Provide pavement markings including crosswalks, in accordance with MUTCD.

Provide signage to match existing, in accordance with MUTCD.

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 wheel stops and bollards in accordance with the UFC 3-200-10N, *Civil Engineering*.

G202006 RESURFACING

Provide resurfacing of existing pavement by bituminous overlay.

G202007 MISCELLANEOUS STRUCTURES AND EQUIPMENT

G202090 OTHER PARKING LOTS

G2030 PEDESTRIAN PAVING

Provide a network of Portland cement concrete sidewalks, separated from, but connected to vehicular circulation systems, to allow pedestrian circulation between various elements of the project.

G203001 BASES & SUBBASES

G203002 CURBS & GUTTERS

G203003 PAVED SURFACES

G203004 GUARDRAILS & BARRIERS

G203005 RESURFACING

G203006 OTHER WALKS, STEPS & TERRACES

G2040 SITE DEVELOPMENT

G204001 FENCING & GATES

Provide chain link security fence as indicated on the drawings in another part of this RFP.

Provide zinc-coated steel fencing components in accordance with FS RR-F-191/1, Type 1 for the fencing system.

For the security fence, provide one single line fence surrounding the restricted area. Provide security clear zones as required. Ensure that the fabric height is at least 7 feet (2.1 m). Provide outriggers and three strands of barbed wire.

G204002 RETAINING AND FREESTANDING WALLS

G204003 EXTERIOR FURNISHINGS

All site furnishings shall conform to the Base Exterior Architectural Plan (BEAP) and the Installation and Appearance Plan. Provide picnic tables, trash receptacles, benches, and exterior wash-down areas (see UFC 4-721-10) and shaded structures to include picnic tables and barbeque grills.

Provide picnic shelters as indicated in Part 3, Site Analysis. Picnic areas shall be designed to accommodate up to twelve people.

G204004 SECURITY STRUCTURES

Provide a passive barrier system including bollards, posts, guardrails, ditches, and cable reinforced fence.

Each bollard shall withstand a 10,000 pound (4536 kg), vehicle at impact speed of 40 mph (65 kph), with a maximum bollard deflection or vehicle penetration of 20 feet (6 m). The cable reinforced fence shall be designed for a 4000 lb (1814 kg) vehicle traveling at 40 mph (64 kph) with a maximum penetration of 40 feet (12.2 meters).

G204005 SIGNAGE

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

G204006 FOUNTAINS & POOLS

G204007 PLAYING FIELDS

G204008 TERRACE AND PERIMETER WALLS

G204009 FLAGPOLES

G204090 OTHER SITE IMPROVEMENTS

Provide dumpster pads and enclosures.

G2050 LANDSCAPING

Provide complete landscaping consisting of lawn, groundcover, trees, shrubs, perennials and ornamental grasses as required to provide a quality, cost-effective, functional and visually appealing landscape program that will enhance the development, while complying with all applicable anti-terrorism, force protection and physical security requirements.

Guarantee all landscaping for a period of one year after final acceptance of the project.

Provide complete landscaping maintenance, including routine mowing, for one full growing season after completion of planting. The growing season is a minimum of 30 days and shall not exceed one year.

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

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

G205001 FINE GRADING AND SOIL PREPARATION

Provide fine grading and soil preparation to provide proper drainage away from buildings and ready for seeding.

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

See G205005 Plantings.

G205004 SEEDING SPRIGGING AND SODDING

Provide centipede grass sod and fertilize grass areas and other pervious areas disturbed by Contractor operations.

G205005 PLANTINGS

Preserve existing trees to the greatest extent possible.

--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 all piping and appurtenances for condensate, chilled water, liquid fuel, natural gas, and including all accessories and devices as necessary and 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 applicable regulatory agency that governs and issues permits for the construction and operation of these systems.

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 all permits to comply with all federal, state, and local regulatory requirements associated with this work. The contractor shall complete the "Permits Record of Decision" (PROD) form with the first design submittal package. A blank PROD form can be obtained at the Download Tab of Part 6 of the NAVFAC Design-Build website at the following link http://www.wbdg.org/ndbm/Download/Down_Additional.html?Section=AdditionalInfo . Contractor shall determine correct permit fees and pay said fees. Copies of all permits, permit applications, and the completed PROD form shall be forwarded to the Government's Civil/Mechanical Reviewer.

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

Utility connection points are indicated on the drawings in another part of this RFP. Obtain final approvals from the Government's Civil/Mechanical Reviewer and the Contracting Officer for all utility connection points associated with this work.

Coordinate with the local utility providers and pay any fees or charges required to connect to their utility.

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

Provide all required fittings, connections and accessories required for a complete and usable system. All equipment shall be installed per the criteria of PTS Section G30 and the manufacturer's recommendations. Where the word "should" is used in the manufacturer's recommendations, substitute the word "shall".

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 operated and maintained by the MCB Camp Lejeune Public Works Department at (910) 451-7190. Provide the new water system and connections to the existing water system in accordance with UFC 3-200-10N, *Civil Engineering*; the utility provider's requirements; and the state waterworks' regulations; 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 another part of this RFP.

The new water system shall be designed so water consumption for each facility is monitored from one meter. The meter shall be easily accessible.

G301002 POTABLE WATER DISTRIBUTION

Connect the new potable water distribution system to the distribution system at the point indicated on the drawings in another part of this RFP.

Provide exterior corrosion protection on metallic pipe lines.

A water meter on each proposed service line is required. Provide type of meter and remote reading as required by the utility provider.

Provide meter box.

Fire hydrants shall be yellow in color.

Backflow preventers are required on all service entrance lines. If not specified in ESR D20 and D40, provide backflow preventers in a below ground vault outside the building.

G301004 FIRE PROTECTION WATER DISTRIBUTION

Waterline services shall be sized to provide fire suppression water supply as required by the building population and fire protection requirements. Pumps for Fire protection may be required, see Fire Protection ESR Section D40.

A water meter on each proposed service line is required. Provide type of meter and remote reading as required by the utility provider.

Backflow prevention is required for each building. If the building has a dedicated mechanical room, the backflow preventers shall be placed in an accessible location in this room.

Fire hydrants shall be installed and spaced in accordance with UFC 3-600-01, *Fire Protection Engineering for Facilities.*

G301007 PUMPING STATIONS

A package booster pump station will be required.

Provide automatic control to start and stop the pump system.

Provide a telemetering system and recording equipment to a location manned 24 hours a day for the transmission and recording of pump operation. Alarms shall be transmitted to a location manned 24 hours a day.

Provide an emergency generator sized to start up and maintain the total rated running capacity of the station, including the pumps, controls, lighting, ventilation and other auxiliary equipment.

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 operated and maintained by the MCB Camp Lejeune Public Works Department at (910) 451-7190. Provide the new sanitary sewer system and connections to the existing sanitary sewer collection system in accordance with UFC 3-200-10N, Civil Engineering; the utility provider's requirements; and the state sewerage regulations; 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 another part of this RFP. In identifying a suitable point of connection, provide consideration of the capacity of the existing collection system.

G302001 SANITARY SEWER PIPING

Provide sanitary sewer piping, fittings, and accessories as required for project completion.

G302002 SANITARY SEWER MANHOLES & CLEANOUTS

Provide precast concrete manholes only.

G302003 LIFT STATIONS AND PUMPING STATIONS

Tie in to the existing wastewater pump station will be required (provided by P-1017/1047). Provide exterior corrosion protection on metallic force mains.

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 UFC 3-200-10N, *Civil Engineering*; the utility provider's requirements; and the state stormwater management laws and regulations; whichever is more stringent.

Confirm that the existing outfall has adequate capacity to receive the additional stormwater flow generated by the project.

G303001 STORM SEWER PIPING

The following materials for storm sewer piping will not be allowed: ductile iron, corrugated steel, and corrugated aluminum.

As required by other sections of this RFP, for subsurface rain leader collection, provide PVC, corrugated HDPE or reinforced concrete storm sewer pipe with a minimum pipe size of 6 inches.

For all other closed drainage systems provide reinforced concrete storm sewer piping with a minimum storm sewer pipe size of 15 inches.

G303002 STORM SEWER STRUCTURES

Provide pre-cast or cast in place concrete structures.

Provide H-20 load rated frames and grates/covers for all structures.

G303003 LIFT STATIONS

G303004 CULVERTS

The following materials for culvert piping will not be allowed: PVC, ductile iron, corrugated steel, corrugated aluminum, and HDPE.

G303005 HEADWALLS

Headwalls may be used as required.

G303006 EROSION & SEDIMENT CONTROL MEASURES

Provide permanent and temporary Erosion and Sediment Control measures and a State of North Carolina approved plan for all areas being developed with this project in accordance with the state of North Carolina requirements. See Part 3, Project Program, UFC 3-200-10N, Civil Engineering and Part 4 (PTS) paragraph G10-1.10 for specific requirements.

G303007 STORMWATER MANAGEMENT

A stormwater management facility will be required for this project. Storm water management is required for all new impervious areas being developed with this project. Provide permanent and temporary elements required and obtain permits from NCDENR. See Part 3, Project Program, UFC 3-200-10N, Civil Engineering and Part 4, paragraph G303007 for specific requirements. Provide a connection to the storm water system to receive overflow from the rainwater cistern storage tanks when fill capacity is exceeded. See ESR D209004.

The use of Low Impact Development (LID) is required for the project to achieve no net increase in storm water volume. The following LID features shall be considered: bioretention, filter/buffer strips, grassed swales, bioretention swales, wet swales, cisterns, infiltration trenches, rain gardens, permeable pavement/pavers, rainwater harvesting and tree box filters. Comply with the State LID or Storm Water Management Manual where your project is located. If state LID criteria is not available, refer to Low-Impact Development Design Strategies, An Integrated Design Approach http://www.epa.gov/owow/nps/lidnatl.pdf published by U.S. Environmental Protection Agency, Washington, D.C. and UFC 3-210-10 Low Impact Development. Additional resources may be found

at http://www.epa.gov/owow/nps/lid/.

The Designer of Record (DOR) shall evaluate the drainage conditions and submit calculations to the government for civil and environmental review.

The NAVFAC MIDLANT Commanding Officer shall be the only waiver authority for LID. If LID is not implemented on this project, the DOR must provide a written narrative detailing why LID cannot be incorporated into the project design and request a waiver through the Contracting Officer.

G304005 REINFORCED CONCRETE MANHOLES & VALVE BOXES

Provide concrete manholes for valves, expansion joints, and building supply taps. Provide solid plate cover with access and ventilation openings. Provide electric stream operated sump pump in each manhole.

-- End of Section --

6. ENGINEERING SYSTEMS REQUIREMENTS

G40 SITE ELECTRICAL UTILITIES

SYSTEM DESCRIPTION

The site electrical utility system consists of all power, 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. All equipment shall be installed per the criteria of PTS Section G40 and the manufacturer's recommendations. Where the word "should" is used in the manufacturer's recommendations, substitute the word "shall".

G4010 ELECTRICAL DISTRIBUTION

Connect to the existing 12.47 kV, three phase, four wire, 60 Hertz electrical power system. The connection point shall be overhead at the closest available Pole on Gonzalez Blvd and extended to the project site underground in ductbank to a Pad Mounted Transformer. Reference and use "Electrical Site Information" in Part 6 Attachments as a design guide for this work. Coordinate with Public Works Utilities for approval of exact pole and circuit number.

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

Pad mount transformers shall be filled with seed based biodegradable fluid, be dead front, have 10 KV surge arresters, etc. Contact Public Works Utilities for other requirements dealing with distribution transformers.

G401002 TRANSFORMERS

Provide a three phase pad mounted transformer to feed the facility, if required service is 750 kVA or less at 208Y/120 volts.

Provide the following features:

1. Dead-Front Design
2. Loop feed switch
3. Feed-thru inserts
4. Three surge arresters
5. Less-flammable liquid-insulated
6. 20% spare capacity

G401004 OVERHEAD ELECTRIC CONDUCTORS

Provide a three phase overhead pole line as indicated in Section G4010 “Electrical Distribution.”

G401005 TOWERS, POLES, CROSSARMS AND INSULATORS

Poles for overhead power distribution shall be wood.

G401006 UNDERGROUND ELECTRIC CONDUCTORS

Provide a medium voltage and 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.

Use above ground sectionalizers or junction cabinets. Do not use manholes or handholes for UG primary distribution.

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.

Install meters on building or with separate metering enclosure.

Advanced Metering:

In addition to the above requirements, provide advanced meter capabilities to measure usage and link with bi-directional communication system to allow interaction with and monitoring of electricity usage.

Meters will eventually be part of the Department of Navy Advanced Metering Infrastructure (AMI). The AMI system will establish two way communication w/electric meters & retrieve short time interval (15min) data every hour. It will process data at both local Data Acquisition System and Corporate Meter Data Management levels. The AMI program will become the foundation and key enabler of the Navy’s Smart Grid implementation.

Meter shall meet the following minimum functionalities:

(a) Maximum error not to exceed 0.2 percent for meters and 0.3 percent for instrument transformers.

(b) Capability to report alarms and events to data collecting utilizing DOD approved networks.

(c) Capable of data encryption, accreditation, and intrusion detection.

(d) Advanced meters are a constantly changing technology, and may require occasional software

upgrades.

(e) Provide Advanced Meters manufactured by Square D, Weston Solutions, and American Systems.

(f) Meters should be equipped with high powered ERT (900MHz)

Contractors shall verify that the meters installed on any building site is compatible with the base-wide metering system with respect to the types of meters selected and the method used to program the meters for initial use. Software and meter programming tools will be necessary to set up the meters. New software tools different from the meter programming methods currently used by base personnel will require separate approval for use. Where RF Mesh technology is used as the communication method, all electric meters shall be purchased with “repeater” functionality. Contact Bill Anderson, NAVFAC ESC, at bill.anderson1@navy.mil for additional information. Contact Kyle Brown at kyle.t.brown@usmc.mil for base advance metering system information.

NAVFAC MID-ATLANTIC will provide the source files for LED specifications.

G4020 SITE LIGHTING

Provide site lighting for exterior, including but not limited to area parking and roadway lighting, underground distribution, handholes, grounding, poles, fixtures and controls as required for a complete and usable system.

G402001 EXTERIOR LIGHTING FIXTURES AND CONTROLS

Provide solid state LED type lighting fixtures. Contact NAVFAC MidLant for LED specification source file.

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.

Provide exterior lighting for parking areas, recreational areas, and picnic shelters.

G402004 LIGHTING POLES

Provide direct set concrete poles for site lighting. All poles located in areas subject to vehicle damage shall be protected with precast concrete pole guards. Provide composite/fiberglass handholes located as close as practical to poles where pole guards prevent access to pole handholes.

G402005 UNDERGROUND ELECTRIC CONDUCTORS

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

G4030 SITE COMMUNICATION AND SECURITY

Provide a site communication and security system including, but not necessarily limited to, Voice and Data Telecommunications Systems, Mass Notification System (empty conduit system), Fire Alarm System, 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.

Communications system shall be in accordance with the current MCB Camp Lejeune Telephone Specifications section 27 10 00, coordinate with Base telephone (910) 451-9439.

G403001 TELECOMMUNICATIONS SYSTEMS

The connection point for the site telecommunications systems shall be underground at the closest available Telecommunication Manhole on Gonzalez Blvd and extended to the project site underground in a system of manholes and ductbank to the telecommunications equipment room. Reference and use “Electrical Site Information” in Part 6 Attachments as a design guide for this work.

Provide a 25 pair copper and a 12 strand single mode fiber optic cable between the connection point and building entrance facilities.

Provide 4 empty 4 inch conduits with one having four 1 inch innerducts with pull strings.

Designer of Record shall coordinate installation and termination of all exterior telecommunications systems with Base Telephone (Outside Plant). Point of Contact for outside plant is Jim Beck @ (910) 451-9432. All telecommunication equipment and installation shall be in accordance with MCB Camp Lejeune’s Telecommunication Standards, section 33 82 00 located in Part 5 (prescriptive specifications).

G403002 CABLE TV SYSTEMS (CATV)

Provide one empty 4 inch (103 mm) conduits with pull strings, from the telecommunications equipment room to a composite/fiberglass handhole outside of the building footprint for installation of cable television (CATV) wiring. Provide a handhole cover labeled “CATV”. Verify connection point with CATV service provider Charter Communications at (901) 329-1775, Nick Brown (Construction Coordinator). Charter Cable Company will provide cable into the telecommunications equipment room along with the raceway from the handhole to their system point of connection

G403003 CABLES AND WIRING

Cables and wiring for site telecommunications and security systems shall be as indicated in their respective categories.

G403004 DUCTBANKS, MANHOLES AND HANDHOLES

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

G403009 GROUNDING SYSTEMS

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

-- End of Section --

PART 4

PERFORMANCE TECHNICAL SPECIFICATIONS (PTS)

SECTION A10

FOUNDATIONS
3/10

A10 GENERAL

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 3-100-10N, *Architecture*

UFC 3-220-01N, *Geotechnical Engineering Procedures for Foundation Design of Buildings and Structures*

UFC 3-301-01, *Structural Engineering*

Unified Facilities Guide Specifications (UFGS)

UFGS Section 31 23 00.00 20 *Excavation and Fill*

A10 1.2 GENERAL REQUIREMENTS

A10 1.2.1 Earthwork

The Designer of Record shall prepare the following UFGS Specification as part of the project specification and shall include the prepared specification section in the design submittal for the project:

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. Contractor shall perform, at his expense, such subsurface exploration, investigation, testing, and analysis as his Designer of Record deems necessary for the design and construction of the foundation system.

A10 1.2.2.2 Contractor-provided Geotechnical Engineer

The Contractor is required to retain a Geotechnical Engineer experienced and licensed in the geographic region of the project to interpret any provided data as related to his

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.

All work by the Contractor-provided Geotechnical Engineer at the project location shall be coordinated with the Contracting Officer and shall not interfere with normal 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 shall become 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 shall include the following:

a. The project site description, vicinity map and site map indicating the location of borings and any other sampling locations. Provide notes explaining any abbreviations or symbols used
b. Results of all applicable field and laboratory testing, whether Government or Contractor-provided. Address existing subsurface conditions, selection and his 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 shall be limited as required in EM 1110-1-1004, *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, 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. Recommendations shall be presented on a structure-by-structure Basis.

The Geotechnical Report shall be signed by the Contractor-provided Geotechnical Engineer.

The submitted report shall be 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 shall 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 shall 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. The locations of all borings shall be indicated on the drawings. The applicable design drawings shall be revised to reference the Contractor’s Geotechnical Report as being a basis for design.

A10 1.2.3 Pile Driver Analyzer (PDA)

If deemed necessary by the Designer-of-Record's geotechnical engineer, the dynamic wave equation method of analysis, pile driver analyzer, shall be used to validate pile and pile hammer compatibility, establish pile driving criteria, establish terminal penetration resistance, or verify as-driven capacity of the pile. The PDA or static load test(s) shall be required for piles with required allowable design capacity equal to or greater than 40 tons.

A10 1.3 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

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

A10 1.3.1 Earthwork

Perform quality assurance for earthwork in accordance with 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 shall be responsible for performing pre-construction and periodic site visits throughout construction to assess site conditions. The Engineer, with the concurrence of the contractor and the Contracting Officer, shall update the excavation, sheeting, shoring, and dewatering plans as construction progresses to reflect actual site conditions and shall 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 shall be available to meet with the Contracting Officer at any time throughout the contract duration.

A10 1.3.2 Piles

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

Install test piles as directed by the Contractor's Geotechnical Engineer. Pile load tests, if required, shall be performed in accordance with UFC 1-200-01. Test pile installation procedures shall be as directed by the Contractor's Geotechnical Engineer. Results of the pile test program and final pile installation criteria shall be submitted to the Contracting Officer prior to installation of the production piles. If deemed necessary by the Designer-of-Record's Geotechnical Engineer, the dynamic wave equation method of analysis, pile driver analyzer, shall be used to validate pile and pile hammer compatibility, establish pile driving criteria, establish terminal penetration resistance, or verify as-driven capacity of the pile. The PDA or static pile load test (ASTM D 1143) shall be required 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

Design submittals shall be in accordance with Z10, *General Performance Technical Specifications*, UFGS section 01 33 10.05 20, *Design Submittal Procedures*, UFC 1-300-09N, *Design Procedures*and UFC 3-220-01N, *Geotechnical Engineering Procedures for Foundation Design of Buildings and Structures*.

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 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 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) shall 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. Sheeting and shoring plans shall be 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. The termiticide label shall bear 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.

Applicator(s) shall be licensed or certified by the Federal government or the state or the host country, as applicable.

A1010 1.2.2 Warranty

Furnish 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, the Contractor shall:

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

Install 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. Pile hammer shall be 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.

Pile driving equipment shall match the equipment assumptions on which the pile driving formulae used to determine blow counts are based.

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, the clear distance between the heads of piles and the edges of pile caps shall be a minimum of five inches.

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 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 shall 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 in accordance with the requirements of this section and other portions of this RFP.

A1030 SLAB ON GRADE

A103001 STANDARD SLAB ON GRADE

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.

Floor slab on grade shall be designed and constructed in accordance with EM 1110-1-1904, Settlement Analysis and so that any settlement of the floor slab shall 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.

A103003 TRENCHES

Trenches shall be constructed of reinforced concrete with water proof joints and seals to prevent ground water infiltration.

A103004 PITS AND BASES

Pits and bases shall be constructed of reinforced concrete with water proof joints and seals to prevent ground water infiltration.

A103005 FOUNDATION DRAINAGE

A103005 1.1 PERIMETER FOUNDATION DRAINAGE

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. Pipe for the foundation drainage system shall be of the type specified, shall be perforated, and shall be 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 Polyethelene (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 shall be manufacturer's standard type and shall conform to the indicated specification.
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 shall include 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 filled with the bedding material.

A103090 OTHER SLAB ON GRADE

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. Cellular Glass: ASTM C 552
b. Extruded Preformed Cellular Polystyrene: ASTM C 578

The thickness of insulation and thermal resistance value shall be sufficient to meet the applicable building code and energy budget for the facility.

-- End of Section --

SECTION A20

BASEMENT CONSTRUCTION
3/10

A20 GENERAL

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 3-100-10N, *Architecture*

UFC 3-220-01N, *Geotechnical Engineering Procedures for Foundation Design of Buildings and Structures*

UFC 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 shall 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. Contractor shall perform, at

his expense, such subsurface exploration, investigation, testing, and analysis as his Designer of Record deems necessary for the design and construction of the foundation system.

All work by the Contractor-provided Geotechnical Engineer at the project location, if required, shall be coordinated with the Contracting Officer and shall not interfere with normal base operations. Prior to the Foundation Work Design submittal include a Contractor Geotechnical Report (an Adobe Acrobat PDF version on CD and two printed copies) for review and record keeping purposes. The report shall become the property of the Government. Geotechnical reports generated during construction, such as pile driving results and analysis, shall be provided to the Contracting Officer (an 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 shall 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. Recommendations shall be presented on a structure-by-structure basis

The Geotechnical Report shall be signed by a registered Geotechnical Engineer.

The submitted report shall be accomplished 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 shall 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. The locations of all borings shall be indicated on the drawings. The applicable design drawings shall be revised to reference the Contractor’s Geotechnical Report as being a basis for design.

A20 1.3 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

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

A20 1.3.1 Earthwork

Perform quality assurance for earthwork in accordance with 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 shall be responsible for performing pre-construction and periodic site visits throughout construction to assess site conditions. The Engineer, with the concurrence of the contractor and the Contracting Officer, shall update the excavation, sheeting, shoring, and dewatering plans as construction progresses to reflect actual site conditions and shall 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 shall be available to meet with the Contracting Officer at any time throughout the contract duration. The contractor shall bear all costs of the Engineer.

A20 1.4 DESIGN SUBMITTALS

Design Submittals shall be in accordance with Z10, General Performance Technical Specifications, UFGSS section 01 33 10.05 20, *Design Submittal Procedures*, UFC 1-300-09N, *Design Procedures*, UFC 3-301-01, *Structural Engineering*, and UFC 3-220-01N, *Geotechnical Engineering...Structures*.

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 31 23 00.00 20 (02315N), *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) shall 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. Shoring and sheeting plans shall be 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. Liquid asphalt shall be used within 36 hours after loading in the transport tanker.

A202002 1.1.3 Materials

- Bitumen - Asphalt; ASTM D 449, Type I.
- Bituminous Plastic Cement - ASTM D 4586, Type I for asphalt.
- Membrane Fabric

The following requirements shall 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

- Nails - Galvanized roofing nails.
- Primer - ASTM D 41 for asphalt.
- 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 shall 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
03/10

B10 GENERAL

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 3-100-10N, *Architecture*

UFC 3-301-01, *Structural Engineering*

B10 1.2 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

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

B10 1.3 DESIGN SUBMITTALS

Design submittals shall be in accordance with Z10, General Performance Technical Specifications, UFGS section 01 33 10.05 20, *Design Submittal Procedures*, UFC 1-300-09N, *Design Procedures*, UFC 3-100-10N, *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) shall 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.

B101005 BALCONY CONSTRUCTION

Design and construct exterior balconies to drain and with the top of the balcony high-point below the interior floor elevation as required for flashing.

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
03/10

B20 GENERAL

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 Construction Criteria Base (CCB) at the Whole Building Design Guide 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 3-100-10N, *Architecture*

UNIFIED FACILITIES GUIDE SPECIFICATIONS (UFGS)

UFGS 08 34 16.10, *Steel Sliding Hangar Door*

UFGS 08 34 16.20, *Vertical Lift Fabric Door*

B20 1.2 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Verification of satisfactory exterior enclosure system performance shall be 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 UFGS Section 01 45 00.05 20, *Design and Construction Quality Control*. The Contractor shall pay the cost of all testing.

B20 1.2.1 Required Brick Masonry Testing and Field Samples

a. Where field testing is required, masonry strength shall be determined in accordance with 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 shall exhibit the standard for workmanship and materials for the project. The sample panel shall 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, air barrier connections to adjoining construction, sealing of air barrier penetrations vapor barrier, sealant, masonry ties and anchors, and tooling of joints, the range of color and texture of brick veneer, and the color of mortar. The sample panel shall be protected from damage and shall remain at the site until masonry work is complete and approved, at which time the panel shall 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 shall be installed in the masonry field panel, with all accessories, finishes, and trim (see B20 1.2.4 and 1.2.5). Masonry work shall 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 Testing

If required in RFP Part 3, provide air barrier testing and repair as follows:

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 envelope. Record pretest conditions and utilize pictures to assist in the documentation.

b. Air leakage test shall be performed in accordance with ASTM E-779 (2003) or E-1827-96 (2002), with the following additions and exceptions using either Method 1 or Method 2. The flow rate must not exceed 0.25 CFM at 75 Pa per square foot of building envelope 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. At least 12 bias pressure readings must be taken across the envelope and 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. At least 12 bias pressure readings must be taken across the envelope and 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 envelope 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 ASTM C1060-90(1997). 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 0.25 cfm/ft2 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. Air leaks shall be sealed 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 1.2.4 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 1.2.5 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 1.2.5.1 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 shall have an average compressive strength less than the specified ultimate compressive strength.

B20 1.2.5.2 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 1.2.6 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 AAMA 502 method A and method B. Each opening will be tested to achieve performance of ASCE 7-02 calculated requirements (PSF or Kg/m2) for water resistance, which shall not exceed .667 % of the products capable water based on AAMA 101/I.S. 2. Allowable rates of air leakage for field testing shall be 1.5 times applicable AAMA 101/I.S.2 rate for the Product Type and Performance Class.

b. 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 envelope 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 Mockup window subsill and obtain approval of DOR prior to installing window unit.

B20 1.2.7 Curtain Wall Systems Field Sample and Testing

a. At the job site submit for approval by the Designer of Record, a sample curtain wall installation which may be a cut-away portion of a curtain wall, if appropriate, to show the construction, the workmanship, tie-in to building, infiltration and moisture barriers, wrap, flashing, head, window unit installation where required, sill, lintel if required, interior and exterior trim, anchors and reinforcing, and sealants.

b. Provide mock up of (1) designated Curtain Wall System unit to be used in conducting a field mock-up test in strict compliance with AAMA 503 method A and method B. Each opening will be tested to achieve performance of ASCE 7-05 calculated requirements (PSF or Kg/m2) for water resistance, which shall not exceed the derived water expectation of 0 infiltration at the calculated Design Pressure. Allowable rates of air leakage for field testing shall be .30 CFM/Ft2 of wall area test specimen. Performance test at 6.24 PSF (30.3 Kg/m2) allows .30 cfm/ft2. 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 envelope wall in location

selected by DOR.

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 DOR. 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.

The sample curtain wall shall be protected from damage and shall remain at the site until curtain wall construction work is complete and approved, at which time the panel shall be removed from the site. On projects where the curtain wall interfaces with masonry walls, a cut-away sample curtain wall shall be installed with the masonry sample panel. Curtain wall installations shall match the approved sample.

Water Penetration: No water penetration shall occur when the wall is tested in accordance with ASTM E 331 at a differential static test pressure of 20 percent of the inward acting design wind pressure as specified, but not less than 15 psf (80 Kg/m2). Make provision in the wall construction for adequate drainage to the outside of water leakage or condensation that occurs within the outer face of the wall. Leave drainage and weep openings in members and wall open during test.

B20 1.3 DESIGN SUBMITTALS

Design submittals shall be in accordance with Z10, *General Performance Technical Specifications*, UFGS section 01 33 10.05 20, *Design Submittal Procedures*, UFC 1-300-09N, *Design Procedures*, UFC 3-100-10N, *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 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 08 34 16.10, *Steel Sliding Hangar Door*

UFGS 08 34 16.20, *Vertical Lift Fabric Door*

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) shall approve the following submittals as a minimum;

Shop drawings for reinforcing steel in masonry walls, doors, door hardware, windows, storefront, curtainwall, glazing, paint, air barrier system, and visible exterior materials.

All structural elements necessary for construction.

B20 1.4.1 Manufacturer's Verification Inspection Documentation for Galvanized Steel

Manufacturer's verification inspection documentation shall be submitted 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 shall visually inspect all welds and identify all defective welds.
b. The DOR shall be notified in writing of defective welds, bolts, nuts and washers within 7 working days of the date of inspection. All defective connections or welds shall be removed and re-welded or repaired as required by the DOR.

B2010 EXTERIOR WALLS

Exterior wall construction shall consist of exterior skin system of non-structural outside face elements with rain-screen back-up wall systems including; flashing (embedded, exposed, and thru-wall), vapor barriers, air barriers, and insulation systems with interior skin system materials to provide a protective finish on the inside face of exterior walls. Provide all components necessary to direct water that would leak through faulty caulk joints to the outside of wall. Provide flashing, window subsill, caulking, and water barriers around wall openings to direct any water that gets behind the outside surface of the exterior door, window or louver to the exterior of the wall.

All work shall be designed to comply with UFC 3-100-10N, *Architecture*, and UFC 3-301-01, *Structural Engineering*, and the following requirements:

a. Vapor Transmission Analysis - Perform a job specific vapor transmission analysis in accordance with UFC 3-100-10N, Architecture. The conclusion of the analysis shall indicate the appropriate locations of needed vapor retarders, air barriers, 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 shall occur at a pressure of 8 psf (39 Kg/m2) of fixed area when tested in accordance with ASTM E 331.
d. Insulating Value – The complete wall system shall have a minimum insulating value as required by the building code and as required to meet ASHRAE Standard 90.1 as modified by the Energy Policy Act of 2005.

B201001 EXTERIOR CLOSURE

B201001 1.1 MASONRY VENEER EXTERIOR WALL CLOSURE COMPONENTS

B201001 1.1.1 General Requirements

a. Masonry veneer shall include load bearing and non-load bearing exterior walls of the structure, and shall include colored mortar, special shapes such as sills, headers, trim units and copings of brick masonry, precast concrete, concrete masonry units, or other approved material. The veneer shall be tied to the backup wall system with a system that allows the veneer to move independently of the backup

wall system, while being structurally supported. The masonry veneer shall 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) o.k. 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 3-100-10N and BIA Technotes 18, 18A. Joint shall match 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 – Brick shall be ASTM C216, Grade SW, type FBX. ASTM C67 test rating shall 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 shall be the product of a manufacturer regularly engaged in the manufacture of architectural cast stone (precast concrete building unit) products. Cast Stone shall meet or exceed the requirements of ASTM C 1364.

b. Trim units of cast stone shall include sills, fascia, header units, copings and other trim units as required by the approved design

B201001 1.1.5 The Wall Cavity

Comply with UFC 3-100-10N and BIA Technical Notes 21A, 21B, 21C, 28B.

B201001 1.1.6 Through-Wall Flashing Components

a. Through-wall flashing with weep holes shall be incorporated in cavity wall construction as required by UFC 3-100-10N 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. Flashing material shall be as required by UFC 3-100-10N and the following: Flashing shall be 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.

B201001 1.1.7 Reinforcing in Veneer Layer

Reinforcing in the veneer layer shall 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 METAL WALL PANEL EXTERIOR CLOSURE

B201001 1.2.1 General Wall Panel Requirements

a. Factory Color Finish - Panels shall have factory applied, baked coating to the exterior and interior of metal wall panels and metal accessories. Exterior finish topcoat shall be of 70 percent polyvinylidene fluoride (PVDF) resin with not less than 0.8 mil dry film thickness (DFT). Exterior primer shall be standard with panel manufacturer with not less than 0.8 mil dry film thickness (DFT). Panels shall have factory applied 70 percent PVDF clear coating of 0.8 mil DFT over the color topcoat and edge coating for projects within 300 feet (91 meters) of a water shoreline or industrial environment. Field apply 70 percent PVDF clear coat to unfinished panel edges or field cut panels. Interior finish exposed to sun or rain shall be the same coating and DFT as the exterior coating. Interior finish shall be protected from sun or rain exposure.
b. Wall system and attachments shall resist wind loads as determined by ASCE 7, with a factor of safety appropriate for the material holding the anchor. Maximum deflection due to wind on aluminum wall panels shall be 1/60. Maximum deflection due to wind on steel wall panels and girts behind aluminum or steel wall panels shall be limited to 1/120 of their respective spans, except that when interior finishes are used the maximum allowable deflection shall be limited to 1/180 of their respective spans. The structural performance test methods and requirements of the wall system and attachments shall be in accordance with ASTM E 1592.
c. Conformations - Non-insulated steel or aluminum wall panels shall have configurations for overlapping adjacent sheets or interlocking ribs for securing adjacent sheets and shall be fastened to framework using exposed or concealed fasteners, as specified. Length of sheets shall be sufficient to cover

the entire height of any unbroken wall surface when the length of run is 30 feet (9 meters) or less. Design provisions shall be made for expansion and contraction. Where required, provide series 305 stainless steel fasteners factory finished to match panels.

d. Shape - Standard V-beam or boxed beam type having 5 to 8 inch (125 mm to 200 mm) pitch for steel panels or 4 to 8 inch (100 mm to 200 mm) pitch for aluminum panels, and 1.5 inch (38 mm) overall depth, exclusive of coating. Other shapes may be considered if approved by the DOR.

B201001 1.2.2 Steel Wall Panels

a. Material and Coating - Form sheets from steel conforming to ASTM A 653/A 653M, Structural Grade 40, galvanized coating conforming to ASTM A 924/A 924M, Class G-90; aluminum-coated steel conforming to SAE AMS 5036; or steel-coated with aluminum-zinc alloy conforming to ASTM A 792/A 792M, except that coating chemical composition shall be approximately 55 percent aluminum, 1.6 percent silicon, and 43.4 percent zinc with minimum coating weight of 0.5 ounce per square foot.

b. Gage - Minimum 22 U.S. Standard Gage for wall panels, but in no case lighter than required to meet maximum deflection requirements specified.

B201001 1.2.3 Aluminum Wall Panels

a. Material and Coating - Form sheets of Alloy 3004 or Alclad 3004 conforming to ASTM B 209 having proper temper to suit respective forming operations.

b. Thickness - Minimum 0.032 inch (0.81 mm) nominal, but in no case thinner than that required to meet maximum deflection requirements specified.

B201001 1.2.4 Insulated Aluminum or Steel Wall Panels

Insulated wall panels shall be steel or aluminum factory-fabricated units with insulating core between metal face sheets securely fastened together and uniformly separated with rigid spacers. Panels shall have a factory color finish. Insulation shall be compatible with adjoining materials and capable of retaining its R-value for the life of the metal facing sheets; and unaffected by extremes of temperature and humidity. The assembly shall have a flame spread rating not higher than 25, and smoke developed rating not higher than 50 when tested in accordance with ASTM E 84. Panels shall be not less than 8 inches (200 mm) wide and shall be in one piece for unbroken wall heights.

Wall panels shall have edge configurations with interlocking ribs for securing adjacent panels. System shall utilize factory fabricated corners and trim pieces at intersections with other materials. Wall panels shall be fastened to framework using concealed fasteners. Installation shall be in accordance with DOR-approved shop drawings and manufacturer’s recommendations.

a. Insulated Steel Panels - Zinc-coated steel conforming to ASTM A 653/A 653M; or Aluminum-zinc alloy coated steel conforming to ASTM A 792/A 792M, AZ 55 coating. Uncoated wall panels shall be 0.024 inch (0.61 mm) thick minimum.

b. Insulated Aluminum Panels - Alloy conforming to ASTM B209, temper as required for the forming operation, minimum 0.032 inch (0.81 mm) thick.

B201001 1.3 STUCCO EXTERIOR WALL CLOSURE

B201001 1.3.1 Portland Cement Plaster

ASTM C150, gray Portland cement Type II with 1/2 inch (13 mm) maximum chopped alkali resistant fiberglass strands, minimum 1.5 percent by weight to cement; 1 1/2 pounds (.68 kg) per sack of cement. Lime shall conform to ASTM C206, Type S. System shall utilize stainless steel or zinc corner beads, J-beads and other accessories.

a. Unless specifically deleted, the system shall utilize an acrylic admixture or coating to give additional moisture suppression to control fungus growth.
b. Sand for Portland Cement Stucco ASTM C 144, except gradation of sand shall conform to the following requirements:
c. Sand Gradation for Basecoats:Sand Gradation for Basecoats:

   Percentage Retained by weight (plus or minus 2 percent) on each sieve

Sieve Size	Min.	Max.
No. 4	0	0
No. 8	0	10
No. 16	10	40
No. 30	30	65
No. 50	70	90
No. 100	95	100

d. Sand for Finish Coats: Natural color and graded within the limits shown above for basecoats, except that the sand shall pass the No. 8 sieve, and for smooth finish the sand shall pass the No. 30 sieve.
e. Mix scratch coat in proportion of one part by volume Portland cement, 3/4 to 1 1/2 parts by volume hydrated lime and 2 1/2 to 4 parts sand (volume of sand per sum of cement and lime). Mix brown coat in proportion of one part by volume Portland cement, 3/4 to 1 1/2 parts by volume hydrated lime and 3 to 5 parts sand (volume of sand per sum of cement and lime). Mix proportions can vary depending on climate and application variations, with the approval of the DOR.
f. Portland Cement Stucco Finish Coat 3 to 5 parts sand (volume of sand per sum of cement and lime).
g. Portland cement plaster application shall be in accordance with ASTM C 926. Furring and lath application shall be in accordance with ASTM C 1063.
h. Bonding Agents: ASTM C 932. Provide for exterior applications to masonry or concrete substrates.

B201001 1.4 EXTERIOR INSULATION AND FINISH SYSTEM (EIFS)

EIMA TM 101 and 01 EIMA TM 101.86. Designate in the project program that EIFS shall be used as the non-primary or the primary exterior finish material for the project. The exterior insulation and finish system (EIFS) shall be a job-fabricated exterior wall covering consisting of sheathing, moisture drainable insulation board system, reinforcing fabric, base coat, finish coat, adhesive, primer, accessories, flashing, sealant, and mechanical fasteners. The system components shall be compatible with each other and with the substrate as recommended or approved by, and the products of, a single manufacturer regularly engaged in furnishing Exterior Insulation and Finish Systems.

All materials shall be installed by an applicator trained and approved by the system manufacturer in accordance with DOR-approved shop drawings and manufacturer’s recommendations. EIFS shall be Class PB or Class PM. Class PB EIFS shall not be used in first floor, high traffic areas, or in areas where pedestrians congregate without at least one layer of 20 ounce (567 grams) reinforcing fabric mesh. Use 1/8 inch (4 mm) minimum thickness for PB finish system. Color of the EIFS finish shall be consistent, with no variation noticeable to the DOR. Seal all joints in EIFS in accordance with ASTM C 1481 and as recommended by the manufacturer. Furnish manufacturer's standard warranty for the EIFS. Warranty shall run directly to Government and cover a period of not less than 5 years from date Government accepted the work.

B201001 1.4.1 EIFS System Components

a. Glass Mat Gypsum Sheathing Board - Conform to ASTM C 1177/C 1177M. Nail Pull Resistance: No less than 120 lb (54.4 Kg) when tested in accordance with ASTM C 473.
b. Mechanical Fasteners - Corrosion resistant and as approved by EIFS manufacturer. Select fastener type and pattern based on applicable wind loads and substrate into which fastener will be attached, to provide the necessary pull-out, tensile, and shear strengths.
c. Thermal Insulation - Drainable type. No portion of any layer of insulation shall be less than 3/4 in (19 mm) thick. The maximum thickness of all layers shall not exceed 4 in (101 mm). Insulation Board shall be certified as aged, in block form, prior to cutting and shipping, a minimum of 6 weeks by air-drying, or equivalent. Insulating material shall conform to ASTM C 578, Type I or IV, as recommended by the EIFS manufacturer and treated to be compatible with other EIFS components.
d. Reinforcing Fabric - Reinforcing fabric mesh shall be alkali-resistant, balanced, open weave, glass fiber fabric made from twisted multi-end strands specifically treated for compatibility with the other system materials, and comply with EIMA TM 105.01 and as recommended by EIFS manufacturer.

B201001 1.5 CONCRETE EXTERIOR WALL CLOSURE

B201001 1.5.1 Precast Concrete Wall Panels:

ACI 211.1 and ACI 301. PCI MNL-116 or PCI MNL-117. Concrete shall have a minimum 28-day compressive strength of 4000 psi (281 Kg/cm2). Air content of plastic concrete shall 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. Design for watertight joints, or weeping joints having back-up water penetration protection in precast elements. Cracking potential of precast concrete elements shall be minimized by implementing expansion and control joints in the precast assembly.

Joints shall include properly sized and placed backing material and fully loaded and tooled sealant joint of no less than 1/4 inch sealant material thickness.

a. Exposed Aggregates - In addition to the above aggregate, facing mixture aggregate, and aggregate for homogeneous panels with exposed aggregate finish, shall 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 shall have toothed lip section to anchor upturned edge of metal snap-lock counter flashing when inserted. Sheet metal shall be stainless steel, 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: 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 1.6 CONCRETE WALL PANEL RESTORATION

Materials, physical and chemical properties, and composition of new concrete shall match that of existing concrete to be repaired, unless samples and testing determine that existing mixtures and materials are faulty or non-performing.

B201001 1.6.1 Existing Concrete Testing

Representative samples of existing concrete shall be taken from areas of the structure to be repaired at indicated locations. The samples shall be taken in accordance with ASTM C 42 and ASTM C 823 and tested 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. Aggregates in the existing concrete shall be evaluated in accordance with ASTM C 136 and ASTM C 295. The air content of the existing concrete shall be determined in accordance with ASTM C 457 and ASTM C 642.

B201001 1.6.2 Admixtures

Air entraining admixtures shall conform to ASTM C 260, water-reducing or -retarding admixtures shall conform to ASTM C 494, and pigments for integrally colored concrete shall conform to ASTM C 979 and ASTM C 1017. Admixtures shall not contain added

chlorides.

B201001 1.6.3 Aggregates

Aggregates shall conform to ASTM C 33.

B201001 1.6.4 Cement

Cement composition shall match that of cement used in existing concrete to be repaired as determined by samples and testing and shall conform to the basic requirements of ASTM C 150, Type I or II. Cement shall have non-shrink (shrinkage compensating) properties and shall conform to ASTM C 1107, Class B or C, expansive cement type.

B201001 1.6.5 Pozzolan

Pozzolan shall conform to 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 1.6.6 Epoxy Anchor Adhesives

An epoxy-resin grout shall be used to bond steel anchors to concrete, and shall be a 100 percent solids, moisture insensitive, low creep, structural adhesive. The epoxy shall conform to ASTM C 881, type IV; grade and class selected to conform to the manufacturer's recommendations for the application. The epoxy adhesive shall be conditioned, proportioned, mixed, and applied in accordance with the manufacturer's recommendations, except as otherwise specified herein.

a. Epoxy-resin grout - Shall be a two-component material, 100 percent solids by weight, formulated to meet the requirements of ASTM C 881, Type I or II. Type I material shall be used when materials or atmospheric temperatures are 70 degrees F (21 degrees C) or above. Type II material shall be used when materials or atmospheric temperatures are below 70 degrees F (21 degrees C). Epoxy-resin grout shall have the ability to structurally rebond cracks, delaminations, and hollow plane conditions in concrete; shall be insensitive to the presence of water; and shall have the capability to penetrate cracks down to 5 mils in width. Materials shall have been used in similar conditions for a period of at least five years.
b. Epoxy Injection Ports - Injection ports for epoxy-resin grout shall be designed for the intended use as detailed in this section and shall be made according to the recommendation of the epoxy manufacturer.

B201001 1.7 WOOD SIDING SYSTEM

B201001 1.7.1 Horizontal Wood Siding

Horizontal Wood Siding: DOC PS 20, exterior, lap type, 6 inches wide, maximum practicable lengths, 7/16 inch (11 mm) thick, smooth face. All surfaces of wood siding and trim shall be shop coated with an alkyd primer.

a. Species and Grades

Utilize species and grades listed:

1) Grade 1 Common spruce-pine-fir; NELMA, NLGA, WCLIB, or WWPA.

2) Grade Prime or D finish, pressure-preservative-treated hem-fir; NLGA, WCLIB, or WWPA.

3) Grade D Select (Quality) eastern white pine, eastern hemlock-balsam fir-tamarack, eastern spruce, or white woods; NELMA, NLGA, WCLIB, or WWPA.

4) Grade D Select northern white cedar; NELMA or NLGA.

5) Grade B & B, pressure-preservative-treated southern pine; SPIB.

B201001 1.8 VINYL SIDING SYSTEM

Integrally colored, vinyl siding complying with ASTM D 3679. Horizontal or vertical pattern with exposure and shape to be compatible with overall design concept. Install in accordance with manufacturer’s recommendations.

B201001 1.8.1 Texture, Thickness, Finish and Color

Wood grain texture. Minimum Nominal Thickness: 0.044 inch (1.1 mm). Minimum Profile Depth (Butt Thickness): 5/8 inch (16 mm) or 3/4 inch (19 mm). Nailing Hem: Double thickness. Nailing process and fasteners shall be approved by the manufacturer.

B201001 1.8.2 Accessories

Provide integrally colored, premanufactured accessories to match siding. Use accessories at terminations with other materials.

B201001 1.9 MANUFACTURED FACED PANELS SYSTEMS EXTERIOR WALL SIDING

B201001 1.9.1 Glass Fiber Reinforced Cementitious Panels System

Siding made from fiber-cement board that does not contain asbestos fibers; complies with ASTM C 1186, Type A, Grade II; is classified as noncombustible when tested according to ASTM E 136; and has a flame-spread index of 25 or less when tested according to ASTM E 84. Install in accordance with manufacturers recommendations. Panel system shall be a horizontal siding pattern in plain or beaded-edge style, unless vertical sheet panels are allowed by the RFP Part 3. Texture: Rough sawn or smooth, factory primed.

B201001 1.10 OTHER EXTERIOR WALL CLOSURE

B201001 1.10.1 Glass Block

a. Glass block units shall be made of clear colorless glass. Units to have polyvinyl butyral edge coating. Units to have 75 percent light transmission allowance. System shall utilize ventilators and accessories recommended by glass block manufacturer. Glass block specified is manufactured by Pittsburgh Corning Corporation. The manufacturer's name and catalog identification are provided to describe physical characteristics and functional requirements of the product

desired. Other manufacturers' products that are considered to be the functional equivalent will be acceptable.

b. Exterior Glass Block Units shall be DECORA, VUE, or ARGUS pattern. Units designated as "reflective glass block" shall have a highly reflective oxide surface coating of a gray color.

B201001 1.10.2 Concrete Unit Masonry

Masonry walls shall 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, ground-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 shall 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 shall 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

Dampproofing - Dampproof the cavity-facing wythe of the backup masonry using asphaltic primer according to ASTM D 41, if dampproofing is not provided by a sprayed on foam or other DOR-approved membrane insulation system. Coordinate dampproofing materials and methods to provide vapor transmission control for the lifetime of the structure. Repair any dampproofing damaged by other construction operations.

B201002 1.2 LOAD-BEARING METAL FRAMING SYSTEM

Exterior Studs:

Max. Deflection Criteria	Exterior Finish
L/360	Cement Plaster, Wood Veneer, Synthetic Plaster, Metal Panels
L/600	Brick Veneer, Stone Panels

Wall deflections shall be computed on the basis that studs withstand all lateral forces independent of any composite action from sheathing materials. Studs abutting windows or louvers shall also be designed not to exceed 1/4-inch maximum deflection and as required in UFC 4-010-01.

a. Studs - ASTM A 1003/ASTM A 1003M, Structural Grade 50, Type H minimum; provide Z180 (G60) galvanized coating in accordance with ASTM A 653/ASTM A 653M. Do not expose studs to direct moisture contact. Studs shall be stamped with manufacturer's name, initials, or logo, an ICBO number, material thickness and yield strength. Size and gage shall be as required to meet the loading requirements specified.

b. Bracing - Provide horizontal bracing in accordance with design calculations and AISI SG-673, consisting of, as a minimum, runner channel cut to fit between and welded to the studs or hot- or cold-rolled steel channels inserted through cutouts in the web of each stud and secured to studs with welded clip angles. Provide bracing, as a minimum, at 5 feet (1.52 meters) o.c. for wind load only, and 3"-4"(1.0 meters) o.c. for axial loads.

c. Sheathing - Provide sheathing to withstand structural loads imposed on the wall structure. Cover sheathing with either a 15 pound asphalt-impregnated building paper, or air barrier as required by the wall moisture analysis. Sheathing shall be one of the following:

1) Plywood: C-D Grade, Exposure 1, with an Identification Index of not less than 24/0.

2) Structural-Use and OSB Panels: Sheathing grade with durability equivalent to Exposure 1, Span Rating of 24/0 or greater.

3) Gypsum: ASTM C 79/C 79M and ASTM C 1177/C 1177M, 1/2 inch (13 mm) thick fire retardant (Type X) 5/8 inch (15 mm) thick; 4 feet (1.2 meters) wide with square edge for supports 16 inches (400 mm) o.c. with or without corner bracing of framing. Gypsum sheathing shall be faced with materials capable of resisting six months of weathering exposure without degradation of the covering or the gypsum. Seal all joints as recommended by the manufacturer.

B201002 1.3 WOOD FRAMING SYSTEM

All materials shall be kiln-dried lumber complying with DOC PS 20. Installation shall be in accordance with AF&PA T11. System shall use preservative pressure treated lumber at sill plates and other members in contact with concrete and masonry surfaces.

a. Species and Grades - Provide species and grades listed:

1) Grade 2 Common spruce-pine-fir; NELMA, NLGA, WCLIB, or WWPA.

2) Grade 2 Common, hem-fir; Douglas-fir; NLGA, WCLIB, or WWPA.

3) Grade 2 Common, southern pine; SPIB.

b. Sheathing - Sheathing shall withstand structural loads imposed on the wall structure. Cover sheathing with either a 15 pound asphalt-impregnated building paper, or air barrier as required by the wall moisture analysis. Sheathing shall be one of the following:

1) Plywood: C-D Grade, Exposure 1, with an Identification Index of not less than 24/0.

2) Structural-Use and OSB Panels: Sheathing grade with durability equivalent to Exposure 1, Span Rating of 24/0 or greater.

3) Gypsum: ASTM D 3273 for mold resistance, ASTM C 1177/C1177M, fire retardant (Type X) 5/8 inch (15 mm) thick; 4 feet (1.2

meters) wide with square edge for supports 16 inches (400 mm) o.c. with or without corner bracing of framing. Gypsum sheathing shall be faced with material capable of resisting six months of weathering exposure without degradation or the covering or the gypsum. Seal all joints as recommended by the manufacturer.

B201002 1.4 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. Concrete construction must be in accordance 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. Cracking potential of precast concrete elements shall be minimized by implementing expansion and control joints in the precast assembly.
f. Joints shall include properly sized and placed backing material and fully loaded and tooled sealant joint of no less than 1/4 inch sealant material thickness.

B201003 INSULATION & VAPOR RETARDER

Insulation, Vapor Retarders, and Air Barrier Systems in or on Exterior Enclosure shall include: insulation, liquid, sheet or continuous film materials installed separately in or on wall assemblies to provide resistance to heat loss/gain, and vapor penetration.

B201003 1.1 VAPOR RETARDER

Comply with ASTM C755. Incorporate in the exterior wall system where required by vapor transmission calculations or dew point analysis indicates the need or in conditions of high moisture exposure.

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

Provide continuous air barrier that is durable to last the life of the facility. Seal all holes and seams in the air barrier. Support air

barrier 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. Do not install electrical boxes or fixtures with holes through the air barrier.

Air barrier materials shall have an air permeance not to exceed 0.004 cfm/sf at 0.3"wg (0.02L/s. m2 at 75 Pa) when tested in accordance with ASTM E 2178. Provide installation, seal edges, seal transitions, and seal penetrations as recommended by the air barrier manufacturer. Seal the air barrier in a flexible manner to allow for relative movement of adjacent building envelope components. Air barrier installation at windows shall be in accordance with ASTM E 2112.

Provide building envelope drawings indicating and locating each material that makes up the continuous air barrier. Details of the air barrier shall clarify edges, transitions, and penetrations sealing methods. In addition, identify the boundary limits of the air barrier and of the zone or zones to be tested for building air tightness.

Provide minimum 40 mil DFT elastomeric spray or 36 mil elastomeric sheet barrier when air barriers are used as water barriers.

B201003 1.3 INSULATION SYSTEMS

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 shall be provided. Wall insulating product shall have a minimum R-value to meet the code and the energy design of the facility. Seal the joints in rigid insulation within cavity/veneer walls for additional moisture and air infiltration protection.

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. Parapets shall be designed 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 shall 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

Wall louvers shall be drainable blade type louver 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 shall be made to 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 shall 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 shall drain water to the outside of the building. Louvers shall 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 shall be factory finished coating in accordance with AAMA 2605 with a minimum coating thickness of 1.2 mils. Formed metal panels from galvanized steel sheet per ASTM A 653 or aluminum sheet per ASTM B 209.

B201005 1.3 STORM SHUTTERS

B201005 1.3.1 Roll Shutters

Roll shutters shall have factory finished 0.050 inch (1.27 mm), 6063-T5/T6 aluminum slats with continuous over-head housing, frame and tracks. Roll shutter shall be capable of being locked in a closed position by a non-key device.

B201005 1.3.2 Accordion Shutters

Accordion shutters shall have factory-finished aluminum alloy 6063-T5/T6 slats and tracks. Accordion shutter shall have stainless steel wheel carriers, nylon wheels and guides with stainless steel fasteners and be capable of being locked in a closed position by a non-key device.

B201005 1.3.3 Hinged Louvered Shutters

Hinged louvered shutters shall have factory finished 0.50 inch (13 mm), 6063-T5/T6 aluminum louvered blades and frames with stainless steel hinges, holders, and fasteners. Allow minimum space between horizontal louver blades. Provide storm bar where required due to the lateral loads imposed on the shutter.

B201005 1.3.4 Removable Shutters

Removable shutters shall have formed factory finished 0.050 inch (1.27 mm), 3003-H16 aluminum panels and continuous 6063-T5/T6 header and base frame with stainless steel fasteners or spring tempered stainless steel clips.

B201005 1.3.5 Exterior Door Louvers

If allowed by UFC 4-010-01, louvers for exterior doors shall be inverted "Y" type with minimum of 30 percent net-free opening. Weld or tenon louver blades to continuous channel frame and weld assembly to door to form watertight assembly. Form louvers of hot-dip galvanized steel of same gage as door facings. Louvers shall have steel-framed insect screens secured to room side and readily removable. Louvers shall have aluminum wire cloth, 18 by 18 or 18 by 16 inch mesh, for insect screens. Net-free louver area to be before screening.

B201006 BALCONY WALLS & HANDRAILS

B201006 1.1 PRECAST CONCRETE BALCONY WALLS

Precast concrete balcony walls shall be in accordance with section B201001 EXTERIOR CLOSURE paragraph titled, "Precast Concrete Wall Panels."

B201006 1.2 UNIT MASONRY BALCONY WALLS

B201006 1.2.1 Clay Masonry Units

Clay masonry balcony walls shall be in accordance with section B201001 EXTERIOR CLOSURE, paragraph titled, "Face Brick."

B201006 1.2.2 Concrete Masonry Units

Concrete masonry balcony walls shall be in accordance with section B201001 EXTERIOR CLOSURE, paragraph titled, "Unit Masonry."

B201006 1.3 METAL FRAMED ASSEMBLY BALCONY WALLS

Metal framed assembly balcony walls shall be in accordance with section B201001 EXTERIOR CLOSURE, paragraph titled, "Load Bearing Metal Framing System."

B201006 1.4 WOOD FRAMED ASSEMBLY BALCONY

Wood framed assembly balcony walls shall be in accordance with section B201001 EXTERIOR CLOSURE, paragraph titled, "Wood Framing System."

B201006 1.5 HANDRAILS

Design handrails and anchorage connections to resist loads in accordance with IBC. Provide materials in accordance with NAAMM PR, 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 with a minimum coating thickness of 1.2 mils unless otherwise noted.

B201006 1.5.1 Steel Handrails

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 shall be provided. Steel railings shall be of 1 1/2 inches (38 mm) nominal size. Railings shall be hot-dip galvanized, shop primed shop painted for exterior applications.

B201006 1.5.2 Aluminum Handrails

Aluminum railing shall 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 shall be coated with a high performance coating or anodized in accordance with AAMA 611, Class I. All fasteners shall be Series 300 stainless steel.

B201006 1.5.3 Wood Handrails

Wood handrails shall be of pre-finished natural hardwood in oak,

walnut, or ash. Wood shall be coated with hard acrylic finish to withstand indentations.

B201007 EXTERIOR SOFFITS

Exterior soffit system assemblies shall include trim and necessary accessories including high performance coatings, if required. Installation shall be crisp, fit and trim with tight joinery to back-up framing. Soffits shall be designed 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 insulating envelope.

B201007 1.1 METAL SOFFIT PANELS

Metal soffit panels shall be factory-formed and factory-finished. Use factory-applied sealant in side laps

B201007 1.2 VINYL SOFFIT SYSTEM

If required, provide integrally colored vinyl soffit complying with ASTM D 4477.

B201007 1.3 EXTERIOR GYPSUM BOARD SYSTEM

Exterior gypsum wall board soffit system shall be tapered edge 5/8 inch (16 mm) thick, 48 inch (1.2 meter) wide exterior gypsum board panels conforming to ASTM C 931 and ASTM C 840, mechanically attached to galvanized non-load bearing framing conforming to ASTM A 653, G60 and ASTM C 754. Tape and finish gypsum board joints in accordance with ASTM C840. Soffit design shall assure that the gypsum soffit material does not have direct water contact.

B201008 WALL FLASHING

Flashing shall be aluminum or stainless steel or copper. 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). Copper shall conform to ASTM B 370, cold rolled temper. Thickness of copper shall be 20 ounces per square foot (6.125 Kg/m2).

B201009 EXTERIOR PAINTING AND SPECIAL COATINGS

B201009 1.1 GENERAL REQUIREMENTS

Painting practices shall comply with applicable federal, state and local laws enacted to insure compliance with Federal Clean Air Standards. Apply coating materials in accordance with SSPC PA 1. SSPC PA 1 methods are applicable to all substrates.

All paint shall be 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.

MPI paint systems identified in the RFP take precedence over other MPI systems listed in the MPI literature. If the RFP does not identify a paint system applicable to all painting of the facility, utilize MPI tested systems listed in the MPI *Architectural Painting, Exterior System*manual to identify appropriate paint coatings. Utilize the "Detailed Performance Premium Grade" systems and comply with all limitations stated in the MPI "Approved Products List" for each system.

Paints and coatings shall comply with Master Painters Institute Green Performance Standard GPS-1-08 which is available at the following website;
http://www.specifygreen.com/EvrPerf/EnvironmentalPerformance.html .
Choose paints that provide performance and are environmentally friendly.

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 shall be removed prior to mechanical cleaning. Cleaning shall 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, shall be spot-primed with a suitable corrosion-inhibitive primer capable of preventing flash rusting and compatible with the coating specified for the adjacent areas.

B201009 1.1.1 MPI Gloss Levels

Gloss levels shall 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. Use G2 "Velvet-like" flat for vertical surfaces and undersides of balconies and soffits. Use G3 "Eggshell-like" in high "traffic areas for ceilings and walls, when a surface can be touched and a slightly more durable finish is desired, and for dark accent colors. Use G5 Semigloss for ceilings, walls, doors and trim for high durability and cleanability. Use G6 Gloss only in special situations such as for exterior wood and metal, piping identification, or special effects. The MPI gloss and sheen standard values are per ASTM D523, method D 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.
d. DFT – The short-term designation for dry film thickness. DFT is the minimum acceptable depth or thickness of a coating or system in the dry state. The maximum acceptable DFT is not more than 50% greater than the minimum acceptable DFT (example... DFT = 2 mils, maximum DFT = 3 mils). The DFT indicated in the paint systems below relate to new coatings - MPI INT. MPI RIN will be less than the indicated DFT.
e. Paint Systems Abbreviations: BF – block filler; C – clear coat; SP – spot primer ;P – primer coat; I – intermediate coat; T – topcoat; .

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" or "shall" 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.

B201009 1.2 EXTERIOR CONCRETE FINISHES

New and Existing, previously painted concrete, vertical surfaces, undersides of balconies and soffits, but excluding tops of slabs:

a. Latex, System DFT: 3.5 mils

1) MPI EXT 3.1K/ REX 3.1L-G2 (Flat)/; P: MPI 3, I: MPI 10, T: MPI 10

2) MPI EXT 3.1K/ REX 3.1L-G3/G4 (Low sheen); P: MPI 3, I: MPI 15, T: MPI 15

New and Existing, previously painted concrete floors, patios, and

walkways with low contact and traffic. Not for high abuse, wheel traffic, or high humid area applications:

a. Latex, System DFT: 3.5 mils

1) MPI EXT/ REX 3.2A-G2/G3 (Low gloss); P: MPI 60, I: MPI 60, T: MPI 60

B201009 1.3 EXTERIOR CONCRETE MASONRY FINISHES

New and Existing, previously painted concrete masonry:

a. Latex, System DFT: 11 mils

1) MPI EXT/REX 4.2A-G2 (Flat); BF:MPI 4, P:MPI 10, I:MPI 10, T: MPI 10

2) MPI EXT 4.2A-G3/G4 (Low sheen) / REX 4.2-G5; BF:MPI 4, P:MPI 15, I: MPI 15, T: MPI 15

B201009 1.4 EXTERIOR METAL FINISHES

B201009 1.4.1 New Steel that has been hand or power tool cleaned to SSPC SP 2 or SP 3:

a. Alkyd, System DFT: 5.25 mils

1) MPI EXT 5.1Q-G5 (Semigloss)/REX 5.1D-G5; P:MPI 23, I:MPI 94, T:MPI 94

B201009 1.4.2 New Steel that has been blast cleaned to SSPC SP 6:

a. Alkyd, System DFT: 5.25 mils

1) MPI EXT/ REX 5.1D-G5 (Semigloss); P:MPI 79, I:MPI 94, T:MPI 94

B201009 1.4.3 New and existing steel that has been blast cleaned to SSPC SP 10:

a. Waterborne Light Industrial, System DFT: 8.5 mils

1) MPI EXT 5.1R-G5 (Semigloss); P:MPI 101, I:MPI 108, T:MPI 163

B201009 1.4.4 New Galvanized surfaces:

a. Epoxy P/Waterborne Light Industrial, System DFT: 4.5 mils

1) MPI EXT 5.3K-G5 (Semigloss); C:MPI 25, P:MPI 101, I:MPI 161, T:MPI 161

B201009 1.4.5 Galvanized surfaces with slight coating deterioration, with little or no rusting:

a. Epoxy P/Waterborne Light Industrial Coating, System DFT: 4.5 mils

1) MPI EXT 5.3K-G5 (Semigloss); C:MPI 25, P:MPI 101, I:N/A, T:MPI 163

B201009 1.4.6 Galvanized surfaces with severely deteriorated coating or

rusting:

a. Epoxy P/Waterborne Light Industrial Coating, System DFT: 8.5 mils

1) MPI EXT 5.3K-G5 (Semigloss); C:MPI 25, P:MPI 101, I:MPI 163, T:MPI 163

B201009 1.5 EXTERIOR WOOD FINISHES

B201009 1.5.1 New and existing uncoated, dressed lumber or plywood, including backprime, top, bottom, and edges of doors not specified otherwise:

a. Alkyd, System DFT: 5 mils

1) MPI EXT 6.3B-G5 (Semigloss); P:MPI 7, I:MPI 94, T:MPI 94

b. Latex, System DFT: 5 mils (Not for human or abrasive contact areas)

1) MPI EXT 6.3A-G5 (Semigloss); P:MPI 7, I:MPI 11, T:MPI 11

B201009 1.5.2 Existing dressed lumber or plywood, including top, bottom, and edges of doors previously coated with an alkyd / oil based finish:

a. Alkyd, System DFT: 5 mils

1) MPI REX 6.3B-G5 (Semigloss); P:MPI 5, I:MPI 94, T:MPI 94

b. Latex, System DFT: 5 mils (Not for human or abrasive contact areas)

1) MPI REX 6.3A-G5 (Semigloss); P:MPI 5, I:MPI 11, T:MPI 11

B201009 1.5.3 Existing dressed lumber or plywood, including top, bottom, and edges of doors previously coated with an latex / waterborne finish:

a. Latex, System DFT: 4.5 mils

1) MPI REX 6.3L-G5 (Semigloss); P:MPI 6, I:MPI 11, T:MPI 11

B201009 1.5.4 New and existing dressed lumber or plywood, including stairs and decks:

a. Latex, System DFT: 4.5 mils(not for use in high traffic areas)

1) MPI REX 6.5A-G5/G6 (Low Gloss); P:MPI 5, I:MPI 60, T:MPI 60

B201009 1.6 EXTERIOR STUCCO FINISHES

B201009 1.6.1 New and existing stucco or plaster:

a. Latex, System DFT: 4.5 mils

1) MPI EXT/REX 9.1J-G3/G4 (Low sheen); P:MPI 3, I:MPI 15, T:MPI 15

2) MPI EXT/REX 9.1J-G5 (Semigloss); P:MPI 3, I:MPI 11, T:MPI 11

B201010 EXTERIOR JOINT SEALANT

Sealant joint design, priming, tooling, masking, cleaning and application shall be in accordance with the general requirements of *Sealants: A Professionals' Guide*from the Sealant, Waterproofing & Restoration Institute (SWRI). All sealant shall conform to ASTM C 920.

Joints shall 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 shall be tooled. Tooling shall 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 shall be manufactured devices to provide sun control on exterior windows and storefronts. Sun control devices shall be designed and installed to withstand the wind loads prevailing at the project site.

B201011 1.1 EXTERIOR SUN SCREENS

Exterior sun screens shall be of aluminum with 6063-T5/T6 aluminum demountable frame attachment. Screen material shall be formed factory finished metal from aluminum sheet per ASTM B 209. Screen material shall be factory finished coating in accordance with AAMA 2605 with a minimum coating thickness of 1.2 mils. Sunscreen shall 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 shall conform to the applicable portions of Section B201001 EXTERIOR CLOSURE.

B201090 OTHER EXTERIOR WALLS

B2020 EXTERIOR WINDOWS

Standard windows shall be in compliance with ANSI/AAMA/WDMA 101, SWI SWS, UFC 4-010-01, ASHRAE 90.1, 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 shall 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 shall 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) shall 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 for facilities over three stories tall without interior window cleaning access from pivoting or tilting sash. Provide anchors in accordance with OSHA standard 29 CFR Section 1910.66.

Windows shall be provided with sills on the exterior and stools on the interior of the opening. Sills shall 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 shall be slate or solid polymer for commercial construction and painted wood for residential construction.

B202001 WINDOWS

Exterior windows shall 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, integrated blinds set between glass panels and security grilles. Provide jamb support for larger windows where recommended by manufacturer. Metal windows with insulating glass shall have thermally broken frames and sash.

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 tinted glazing. Aluminum screens shall 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 tinted glazing. Aluminum screens shall comply with ANSI/SMA 1004.

Exposed aluminum surfaces shall 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 residential construction. Provide a minimum of architectural Class I anodized coating or a high-performance organic coating conforming to AAMA 2605 for non-residential (commercial) construction. AAMA coatings shall 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" shall conform to the requirements of AAMA 1302.

B202001 1.1.4 Plastic Windows, Factory Finish

Provide integral colored or co-extruded color PVC, welded and reinforced corners, reinforcing members, fasteners, hardware, weatherstripping, welded sill, and anchors conforming to ANSI/AAMA/WDMA 101 or ASTM D 4099. The exterior grade polyvinyl chloride extrusion shall comply with AAMA 303 and ASTM 4726.

B202001 1.1.5 Wood Windows

Wood windows shall consist of complete units including sash, glass, frame, weatherstripping, insect screen, and hardware. Window units shall meet the requirements of AAMA 101, except maximum air infiltration shall not exceed 0.30 CFM per linear foot of sash crack when tested under uniform static air pressure difference of 1.57 psf (7.66 Kg/m2). Glass and glazing materials shall conform to section B202004, EXTERIOR GLAZING. Insect screen shall meet ASTM D 3656, Class 2, 18 by 14 mesh, color charcoal. Aluminum screen frames shall meet SMA 1004.

a. Finish

1) Vinyl (PVC) Cladding: Preservative treat all basic wood frame and sash members in accordance with WDMA I.S.4, except do not use pentachlorophenol. Clad all exterior surfaces with rigid polyvinyl sheathing, complying with ASTM D 1784, class 14344-C, not less than 35 mil average thickness.

2) Aluminum Cladding: Preservative treat all basic wood frame and sash members in accordance with WDMA I.S.4, except do not use pentachlorophenol. Clad all exterior surfaces with roll formed aluminum with joints sealed during assembly. Aluminum clad frames and sash shall meet performance requirements of AAMA 101. Aluminum finish shall be an organic coating of an AAMA 2604 coating for residential construction and AAMA 2605 for non-residential (commercial) construction with a minimum dry film thickness of 1.2 mils.

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 shall 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 7-05 Wind Speed Calculations determined by the overall average opening within the project.

b. Deflection: Maximum calculated deflection of any framing member in direction normal to plane of wall when subjected to specified design pressures for spans up to and including 13’-6" shall be limited to 1/175 of its clear span and for spans greater than 13’-6" deflection shall be limited to 1/240 + 1/4" of its clear span, except that maximum deflection of members supporting plaster surfaces shall not exceed 1/360 of its span.

c. Air Infiltration - Air leakage through fixed light areas of storefront shall 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 shall 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 7-05 requirements.

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 shall be stainless steel. Weatherstripping shall 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 shall be medium or wide stile. Doors shall 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 shall 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.

B202003 CURTAIN WALLS

B202003 1.1 GLAZED CURTAIN WALL SYSTEM REQUIREMENTS

Provide system complete with framing, mullions, trim, panels, windows, glass, glazing, sealants, insulation, fasteners, anchors, accessories, concealed auxiliary members, and attachment devices for securing the wall to the structure as specified.

Fully coordinate system accessories directly incorporated and adjacent to related work and insure materials compatibility, deflection limitations, thermal movements, and clearances and tolerances as

specified. Design and test in accordance with *AAMA Curtain Wall Manual*.

B202003 1.1.1 Source

Curtain wall system components shall be furnished by one manufacturer or fabricator; however, all components need not be products of the same manufacturer.

B202003 1.1.2 Cleaning Provisions

For curtain wall systems over two stories in height reinforce curtain wall members and provide support for cleaning rigs. The support for cleaning rigs may be provided by other elements of the facility.

B202003 1.1.3 Warranty

a. System Warranty - Manufacturer of the curtain wall system shall be warrant that the design, construction, and materials installed in the system shall be free of manufacturer's defects for the life of the installation. The manufacturer shall provide a similar warranty for the individual components of the system that are provided by other, outside manufacturers. Execute the warranty for the system directly to the Government.
b. Additional Glass Warranty - Insulating glass units shall be guaranteed not to develop material obstruction of vision as a result of dust or film formation on the inner glass surface caused by failure of the seal, other than through glass breakage, within a period of 5 years from date of acceptance of work by the Government. Units failing to comply with the terms of this guarantee shall be replaced with new units without additional cost to the Government. The Contractor shall require the manufacturer to execute their warranties in writing directly to the Government.

B202003 1.1.4 Design

a. Structural Requirements, as measured in accordance with ANSI/ASTM E330:

1) Wind loads for exterior assemblies: Provide systems capable of performing at a minimum C 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 7-05 Wind Speed Calculations determined by the overall average opening within the project.

2) Deflection: Maximum calculated deflection of any framing member in direction normal to plane of wall when subjected to specified design pressures for spans up to and including 13'-6" shall be limited to 1/175 of its clear span and for spans greater than 13'-6" deflection shall be limited to 1/240 + 1/4" of its clear span, except that maximum deflection of members supporting plaster surfaces shall not exceed 1/360 of its span.

3) Water Penetration/Water infiltration - No uncontrolled leakage when tested in accordance with ASTM E331 at test pressure of 10 psf (48.6 Kg/m2) for system standard and capable of performing within the Design Pressure

requirements derived from the ASCE 7-05 requirements.

4) Air Infiltration - Air leakage through fixed light areas of storefront shall not exceed 0.06 cfm per square foot of surface area when tested in accordance with ASTM E283 at differential static pressure of 26.24 psf (30.32 Kg/m2).

b. Delamination: Adhesively bonded metal-faced or glass faced panels shall show no evidence of delamination, warpage or other deterioration or damage when subjected to the six "Accelerated Aging Cycles" specified in ASTM D 1037.

c. Thermal Conductance: The thermal transmittance of opaque panels shall not exceed the specified U-value, when tested in accordance with ASTM C 236. The average calculated thermal transmittance of the complete wall assembly including panels, windows, and all other components shall not exceed a U-value necessary to meet the energy budget of the facility. Determine U-values of components in accordance with ASTM C 236.

d. Window Tests: Windows shall meet the requirements specified herein. Windows shall meet the same requirements for deflection and structural adequacy as specified for framing members when tested in accordance with ASTM E 330 except permanent deformation shall not exceed 0.4 percent; there shall be no glass breakage, and no permanent damage to fasteners, anchors, hardware, or operating devices. Windows shall have no water penetration when tested in accordance with ASTM E 331.

e. Fire Resistance Tests: Insulation provided in the curtain wall system or field applied in conjunction with the curtain wall system shall have a flame spread rating not exceeding 75 and a smoke developed rating not exceeding 150 when tested in accordance with ASTM E 84, except as specified otherwise herein.

1) Insulation: Insulation contained entirely within panel assemblies which meet the flame spread and smoke developed ratings of 75 and 150 respectively. Insulation isolated from the building interior by masonry walls, masonry cavity walls, or encased in masonry cores is not required to comply with the flame spread and smoke developed ratings specified.

2) Curtain Wall Systems: Material for firestopping the opening between the edge of the floor slab and back of the curtain wall system, shall have not less than the flame spread and smoke developed ratings specified for insulation which is neither isolated from the building interior nor encased in masonry cores.

3) Curtain Wall Panels: Panels for fire resistive curtain walls shall have the required fire resistive rating when tested in accordance with ASTM E 119.

4) Firestopping Materials and Devices: Firestopping material and attachment devices shall be an effective barrier against the spread of fire, smoke, and gases for the required period of when exposed to the conditions of the standard ASTM E 119 time-temperature curve for a period equivalent to the fire rating of the floor system and shall also be rated noncombustible when tested in accordance with ASTM E 136.

B202003 1.1.5 Tolerances

Design and erect wall system to accommodate tolerances in building

frame and other contiguous work. Provide with the following tolerances:

a. Maximum variation from plane or location shown on DOR-approved shop drawings: 1/8 inch (3 mm) per 12 feet (3.7 meters) of length up to not more than 1/2 inch (13 mm) in any total length.
b. Maximum offset from true alignment between two identical members abutting end to end in line: 1/16 inch (1.6 mm).

B202003 1.1.6 Structural Requirements

Deflection and Structural Tests: No curtain wall framing member shall deflect, in a direction normal to the plane of the wall, more than 1/175 of its clear span or 3/4 inch (20 mm), whichever is less, when tested in accordance with ASTM E 330, except that when a plastered or gypsum board surface will be affected the deflection shall not exceed 1/360 of the span. No framing member shall have a permanent deformation in excess of 0.2 percent of its clear span when tested in accordance with ASTM E 330 for a minimum test period of 10 seconds at 1.5 times the design wind pressures specified.

B202003 1.1.7 Thermal Movement

Fabricate, assemble, and erect system with adequate allowances for expansion and contraction of components and fastenings to prevent buckling damage, joint seal failure, glass breakage, undue stress on fastenings or other detrimental effects.

B202003 1.1.8 Curtain Wall Components

The curtain wall and the components listed below shall be designed to meet the performance requirements below.

a. Framing Members in Curtain Wall Main Frames and Sash or Ventilator Members: extrusion strength shall meet or exceed the physical properties required for minimum ultimate tensile yield strength of 16,000 psi (110 MPa) when tested under AA ASDI, ASTM E34, and ASTM B221M (or ASTM B221).
b. Joint and Glazing Sealants: Perform tests as required by ASTM C 920.
c. Preformed Compression Gaskets and Seals: ASTM C 864.
d. Preformed Lock-strip Gaskets: ASTM C 542, modified as follows: Heat age specimens seven days at 158 degrees F (70 degrees C), in zipped or locked position under full design compression. Unzip, cool for one hour, re-zip, and test lip seal pressure, which shall be minimum 2.5 pounds per linear inch on any extruded or corner specimen.
e. Spandrel Glass: Fallout resistance test, ASTM C 1048.
f. Porcelain Enamel: Acid resistance, color retention, and spall resistance tests, PEI 1001.
g. Anodized Finishes: Aluminum used for framing shall have a color anodized NAAMM MFM finish designation AA-MIO-C22-A34 and AA-MIO-C22-A44, meeting the requirements of AAMA 611.
h. Glass and Glazing:

   1) Conform to paragraph B202004, GLAZING.

   2) Insulating Glass shall meet ASTM E 546 or ASTM E 576 at minus 20 degrees F (minus 29 degrees C), no frost or dew point.

i. Firestopping Material - Mineral fiber manufactured from asbestos-free materials, and conforming to ASTM C 612 or ASTM C 665, meeting fire resistance requirements specified.

j. Screens - ASTM D 3656, Class 2, 18 by 14 mesh, color charcoal.

k. Panels - Unless otherwise indicated, design for installation from outside the building. Provide vapor retarder on interior face of insulation. Seal edges of panels with cores of absorptive material to prevent entrance of water and allow venting of the core space to outside air.

1) Metal Facing Panels, Single Thickness - Metal facing panels shall be single thickness. Panel facing shall be flat sheet or textured type, made of porcelain enamel, aluminum, bronze, stainless steel and, with backside stiffeners or edge flanges spaced as required to meet flatness specified.

2) Adhesively Bonded Panels - Adhesively bonded panels shall be sandwich type, metal faced both sides, and bonded to form stable and composite unit. Nonexposed face shall be galvanized steel. Exposed face shall be porcelain enamel, aluminum, bronze, or stainless steel, with continuous laminated backing or internal stiffening ribs or breaks spaced as required to meet flatness specified.

3) Nonmetallic Panels

a) Panels shall be glass-faced on the side that will be exposed to view. Glass shall be spandrel glass with ceramic coating on its non-weathering surface and smooth finish on the exposed surface; backing shall be adhesively bonded to non-weathering surface.

b) Adhesively bonded insulated panels shall be nonmetallic faced, sandwich type, tempered hardboard on exposed face and on non-exposed face. Apply coating of epoxy or polyester followed by application of inert aggregate to exposed face in the factory. Inert aggregate shall be natural stone chips.

l. Metal Windows – Conform to ANSI/AAMA/WDMA 101. Provide inside glazing with removable metal glazing beads except for windows with structural glazing. Factory finish aluminum windows and provide with aluminum frame screens with aluminum mesh at operable sash, hardware and locks, and tinted glazing. Aluminum screens shall comply with ANSISMA 1004.

Exposed aluminum surfaces shall 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 residential construction. Provide a minimum of architectural Class I anodized coating or a high-performance organic coating conforming to AAMA 2605 for non-residential (commercial) construction. AAMA coatings shall have a total dry film thickness of 1.23 mils.

m. Metal Accessories - Provide gravel stops and fascias, flashings, metal sills, metal stools, louvers, venetian blind pockets, and closures. Fabricate accessories of sizes and shapes indicated from similar materials and finish as specified for the wall system.

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 shall require the glazing warranty for curtain wall glazing to be 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

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 shall be UL listed and shall 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 shall 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

Insulating glass units shall have 1/2 inch (13 mm) airspace. Provide low emissivity coating. The inner light shall be one of the following:

a. Typically ASTM C 1036, Type I, Class 1, Quality q4, minimum 1/4 inch (6 mm) thick;
b. 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 16 CFR 1201 or possible

glazing impact is anticipated;

c. ASTM C 1172, laminated glass as specified above, when required by antiterrorism requirements.

The outer light shall be one of the following:

a. Typically ASTM C 1036, Type I, Class 2 (tinted heat absorbing or reflective), Quality q4, minimum 1/4 inch (6 mm) thick;

b. 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 16 CFR 1201 or possible glazing impact is anticipated.

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 Bullet-Resisting Glass

ASTM 1172 and UL 752, fabricated from Type I, Class 1, Quality q3 glass with polyvinyl butyral plastic interlayers between the layers of glass and listed by UL ABPMED as bullet resisting, with a power rating of Medium—Small Arms, High—Small Arms, Super—Small Arms, High—Rifle, or as required by the building program in accordance with UL 752.

B202004 1.1.8 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 1.1.9 Spandrel Glass

ASTM C 1048, Kind HS or FT, Condition B (ceramic coated), Type I, Quality q5, 1/4 inch (6 mm) thick.

B202004 1.1.10 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 shall pass the fallout resistance test specified in ASTM C 1048.

B202004 1.2 PLASTIC GLAZING

All plastic glazing exposed to the interior or exterior environment shall have an applied hardcoat.

B202004 1.2.1 Bullet-Resistant Plastic Sheet

Provide cast acrylic sheet or mar-resistant polycarbonate sheet laminated with a special interlayer, and listed in UL 752 as bullet resisting, Class I, II, III, clear, or in color.

B202004 1.2.2 Acrylic Sheet Glazing

ASTM D 4802, Type I, regular, Type II, heat resistant, in various

thicknesses, clear or colored.

B202004 1.2.3 Polycarbonate Sheet Glazing

ASTM D 3595, ANSI Z97.1, Mar-resistant, Clear and smooth both sides when used for vision glazing; Translucent, textured both sides when used for obscure glazing, tint to match frame, ultraviolet stabilized, thickness to be specified in mm and inches, and listed in UL ABPMED as burglar resisting. Mar-resistant sheet shall have a change in haze of between 5 and 8 percent under silica carbide test, 56.44 ounces (1600 grams), ASTM D 673.

B202004 1.3 FRAGMENT RETENTION FILM FOR GLAZING

Existing windows that will not be replaced in the project shall have fragment retention film if they require antiterrorism protection. The film shall be polyester, polyethylene terephthalate, or a composite. Fragment retention film shall be optically clear and free of waves, distortions, impurities, and adhesive lines. The film may be a single layer or laminated. Lamination of the film shall only occur at the factory of the fragment retention film manufacturer. The film shall include an abrasion resistant coating on the surface that does not receive the film adhesive. Fragment retention film shall be a minimum thickness of 0.004 inch (0.1016 mm), or 0.007 inch (0.1778 mm), or 0.010 inch (0.254 mm). The film shall be supplied with an optically clear weatherable pressure sensitive adhesive. The adhesive shall contain ultraviolet inhibitors to protect the film for its required life and shall limit ultraviolet transmission to not more than 8 percent of the radiation between 300 and 380 nanometers. The adhesive shall not be water activated. A water-soluble detackifier or release liner may be incorporated over the adhesive to facilitate film application. The adhesive shall be 90 percent cured within 30 days of installation. Adhesives on film thicknesses of 0.010 inch (0.254 mm) and greater shall be a minimum of 0.0008 inch (0.02032 mm) thick.

B202090 OTHER EXTERIOR WINDOWS

B202090 1.1 OPERABLE TRAY PASS WINDOWS

Frames and glass channels shall be of heavy type 6063-TS aluminum extrusions with reinforcing as required. Include bullet-resistant glazing and heavy-duty operable pass tray. Unit shall have a minimum of architectural Class I anodized coating or a high-performance organic coating conforming to AAMA 2605. AAMA coatings shall have a total dry film thickness of 1.2 mils.

B2030 EXTERIOR DOORS

Exterior doors shall be heavy duty insulated steel doors and frames for service access. Door frames shall 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 STEEL DOORS

Hardware preparation shall be in accordance with ANSI A250.6. Doors shall be hung in accordance with ANSI A115.16.

B203001 1.1.1 Steel Doors

Steel doors shall be ANSI A250.8, Level 4, exterior, main entry doors, with a physical performance level of, Model 1 or 2.

Doors may be specified to be insulated. Door selection shall be specified in the project program according to the following:

a. Standard Duty Doors - Level 1, physical performance Level C, Model [1] [2]
b. Heavy Duty Doors - physical performance Level B, Model [1] [2]
c. Extra Heavy Duty Doors – ANSI A250.8, Level 3, physical performance Level A, Model [1] [2] [3]
d. Maximum Duty Doors – ANSI A250.8, Level 4, physical performance Level A, Model [1] [2]

B203001 1.1.2 Residential Insulated Steel Entry Door Systems

Insulated steel doors and frames shall be provided for residential construction with a core of polyurethane foam and an R factor of 10.0 or more (based on a k value of 0.16). Face sheets, edges, and frames of galvanized steel not lighter than 23 gage thick (0.7 mm) for paneled door faces, or 16 gage thick (1.5 mm) for solid doors, with vinyl door bottom flashing. Frames shall be a minimum 16 gage thick (1.5 mm) respectively; with magnetic weatherstripping; nonremovable-pin hinges; thermal-break aluminum threshold. Doors and frames shall receive phosphate treatment, rust-inhibitive primer, and baked acrylic enamel finish. Doors shall have been tested in accordance with ANSI A250.4 and shall have met the requirements for Level C. Prepare doors to receive specified hardware. Doors shall be 1-3/4 inch (44.5 mm) thick.

B203001 1.1.3 Insulation Cores

Insulated cores shall be of type specified, and provide an apparent U-factor of .48 in accordance with SDI 113 and shall 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 1.1.4 Accessories

a. Louvers shall comply with SDI 111-C, shall be stationary,

sight-proof type. Use lightproof louvers if function of room requires darkness. Louver frames shall 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 shall interlock at intersections and shall be fitted and welded to stationary moldings.

B203001 1.1.5 Standard Steel Frames

ANSI A 250.8. Form frames with welded corners for installation in exterior walls. Form stops and beads of 20 gage steel. Frames shall be set in accordance with ASTM A250.11.

B203001 1.1.6 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 1.1.7 Finishes

a. Exterior Doors, Factory-Primed and Field Painted Finish - Doors and frames shall be factory primed with a rust inhibitive coating as specified in ANSI A250.8. Factory prime doors on six sides of the door. Manufacturer's primer and field painting shall be compatible with finish system in the paragraph "EXTERIOR PAINTING AND SPECIAL COATINGS".

b. Exterior Doors Galvanized Finish - Shall 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.

B203001 1.2 WOOD DOORS

Solid wood or particleboard core with solid wood edge bands and reinforced at all hardware attachments to door with sound grade hardwood. Exterior wood doors are only allowed in residential construction where facility design, overhangs and porches eliminate direct rain/moisture contact from wind driven rain.

B203001 1.2.1 Stile and Rail Doors

Stile and rail doors shall be premium or custom grade Ponderosa pine stile and rail doors conforming to WDMA I.S.6A-01, heavy duty.

B203001 1.2.2 Flush Doors

Flush doors shall conform to WDMA I.S.1-A.

Exterior Flush Doors - Solid wood core, Type I conforming to WDMA I.S. 1-A.

B203001 1.2.3 Wood Door Louvers

Door louvers shall be of the manufacturer's standard design and shall transmit a minimum of 35 percent free air. Louver shall be a galvanized coated louvers with insect screens and comply with SDI 111-C, shall be stationary, sight-proof type. Use lightproof louvers if function of room requires darkness.

B203001 1.2.4 Door Light Openings

Where glazed openings are required, use the manufacturer's standard wood moldings. Moldings for doors to receive a natural finish shall be of the same species and color of the face veneer.

B203001 1.2.5 Fabrication

a. Marking - Each door shall 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 bond for exterior doors. Adhesive for doors to receive a natural finish shall be non-staining.

B203002 GLAZED DOORS

B203002 1.1 ALUMINUM GLAZED DOORS

See B202002 STOREFRONTS, paragraph titled, "Doors and Frames."

B203004 OVERHEAD AND ROLL-UP DOORS

Large exterior overhead and roll-up doors system shall consist of manual or automatic exterior doors and door assemblies. Do not use roll-up doors on exterior walls of conditioned spaces.

B203004 1.1 ROLLING SERVICE DOORS AND GRILLES

Coiling overhead doors shall have minimum 22 gage thermal insulated slats. Electric operators shall have 3-button switches conforming to NEMA MG 1, NEMA ICS 1, and NEMA ICS 2, and auxiliary hand chain operation, weather-stripping and wind-locks. Doors shall be capable of withstanding the design wind loading of ASCE 7 and still operate normally. Finish of the door shall be hot-dipped galvanized with a painted finish.

B203004 1.2 SECTIONAL OVERHEAD DOORS

Sectional overhead doors shall conform to NAGDM 102, Residential or Commercial or Industrial door standards. Metal doors shall be horizontal sections hinged together which operate in a system of tracks to 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. Doors shall be of the standard lift type designed to slide up and back into a horizontal overhead position and requiring a maximum of 16 inches (400 mm) of headroom for 2 inch (50 mm) tracks and 21 inches (525 mm) of headroom for 3 inch (75 mm) tracks, unless a low headroom type is required due to limited headroom, or a high lift type or vertical lift type is required to allow additional working clearance in

the area immediately inside the door. If doors are electrically operated, pushbuttons shall be full-guarded to prevent accidental operation, and include limit switches to automatically stop doors at the fully open and closed positions. Limit switch positions shall be readily adjustable.

Doors shall be capable of withstanding the design wind loading of ASCE 7. Doors shall remain operable and undamaged after conclusion of tests conducted in accordance with ASTM E 330 using the design wind load. Form door sections of hot-dipped galvanized steel not lighter than 16 gage with flush surface without ribs or grooves. Sections shall be not less than 2 inches (50 mm) in thickness. Insulate door sections with fibrous glass or plastic foam to provide a "U" factor of 0.14 or less when tested in accordance with ASTM C 236. Cover interior of door sections with steel sheets of not lighter than 24 gage to completely enclose the insulating material. Provide galvanized steel tracks not lighter than 14 gage for 2 inch (50 mm) tracks and not lighter than 12 gage for 3 inch (75 mm) track. Provide a positive locking device and cylinder lock with two keys on manually operated doors.

B203005 HANGAR DOORS

DOR utilize UFGS Specification Section 08 34 16.10, *Steel Sliding Hangar Doors*, or Specification Section 08 34 16.20, *Vertical Lift Fabric Doors*, for the project specification submittal for the project. Refer to the Project Program for which type of hanger door is used on this project.

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 shall sign and seal the door hardware construction submittal. Provide, as far as possible, door hardware of one manufacturer’s make. All hardware shall 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 shall 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.

For Residential (family housing) projects, use Series 4000, Grade 2 hardware.

B203008 1.3.1 Combination Locks for Sensitive Areas and Vault Doors

If required for exterior use, see C102007 1.1.6 "Combination Locks" for the specification. This installation may require special weather protection.

B203008 1.3.2 Pushbutton Combination Locks

Where required, provide a heavy-duty, mechanical combination lockset with 5 pushbuttons, standard-sized knob or lever, 3/4 inch (19 mm) deadlocking latch with 2-3/4 inch (70 mm) back-set. Provide deadbolt key override option. Safelock, Simplex, and Venn are acceptable manufacturers. Provide a hardware grade equivalent to Grade 1, series 4000. Include a 5-year parts and labor warranty.

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 shall be operated simultaneously by rotating inside lever. Locks with mechanical override lock cylinders are not acceptable. Locks shall 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 shall re-lock immediately after outside lever is turned and latch retracted. Locks shall 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 shall 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 shall sound when exiting only.

System shall be 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 shall 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 shall 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 shall have seven pin tumblers. Cylinders shall be products of one manufacturer, and cores shall be the products of one manufacturer. Rim cylinders, mortise cylinders, and knobs of bored locksets shall 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

Keying system shall be a master key system for the facility, unless more than one tenant/tenant command shall 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 shall be an extension of the existing keying system for additions to existing facilities. The keying system shall allow for construction interchangeable cores when subcontractors require keys during construction. If required, provide a key cabinet.

The Contractor shall 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 shall 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 shall 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 shall 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 UFAS and ADAAG. Lever handles shall meet the test requirements of BHMA A 156.13 for mortise locks. All lever handles (mortise or cylinder) shall 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 shall 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 shall 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 weathersealing may be required by the geographic location of the project.

B203008 1.19 FINISHES

One of the following hardware finish systems shall be provided, and match the interior door hardware:

a. BHMA A156.18. Hardware shall 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 shall have aluminum paint finish, and except steel hinges which shall have BHMA 652 finish (satin chromium plated). Hinges for exterior doors shall 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 shall have finish to match lock and door trim. Hardware for aluminum doors shall be finished to match the doors.
b. BHMA A156.18. Hardware shall have BHMA 612 finish (satin bronze),

unless specified otherwise. Surface door closers shall have bronze paint finish. Steel hinges shall have BHMA 639 finish (satin bronze plated). Exposed parts of concealed closers shall have finish to match lock and door trim. Hardware for aluminum doors shall be finished to match the doors. Hardware showing on interior of bathrooms, shower rooms, toilet rooms, washrooms, laundry rooms, and kitchens shall have BHMA 629 finish (bright stainless steel) or BHMA 625 finish (bright chromium plated).

B203090 OTHER EXTERIOR SPECIALTY DOORS

Where required, provide special function exterior doors and gates and assemblies required for the proper operation and functioning of the facility. Exterior doors system may include factory-finished or painted doors and frames.

B203090 1.1 AUTOMATIC ENTRANCE DOORS

B203090 1.1.1 Automatic Swinging Entrance Door Controller

Automatic swinging entrance doors shall be glazed aluminum doors and frames as specified in this section. Controller shall be a dual function safety device that utilizes planar K-band microwave motion detectors and active infrared presence sensors at each door to protect individuals in the path of the swinging door. The planar K-band motion detector shall be capable of sensing an individual moving as slow as 2.2 inches (55.8 mm) per foot. The infrared sensors shall employ both diffused presence sensors that see through the plane of the door, and distance measuring sensors. The infrared sensors shall constantly remain in operation. The safety device shall call for reactivation or creep closing function, depending on the location of the sensor. If the sensor is located on the swing side, it will call for reactivation; if it is located on the pull side, it will call for creep closing function. Sensing system shall be fully adjustable with a universal remote control, and meet or exceed the requirements of ANSI A156.10. System shall include aluminum guard rails and signage for additional personnel safety.

B203090 1.1.2 Automatic Sliding Entrance Door Controller

Automatic sliding entrance doors shall be glazed aluminum doors and frames as specified in this section. Controller shall be a dual function safety device that utilizes planar K-band microwave motion detectors and focused active infrared presence sensors at each door to protect individuals in the path of the sliding door. The planar K-band motion detector shall be capable of sensing an individual moving as slow as 2.2 inches (55.8 mm) per foot. The focused active infrared sensors shall overlap their patterns for full coverage of the motion pattern and extend its range all the way to the floor surface. The infrared sensors shall constantly remain in operation even when the door is in the closing cycle. Door and frame shall have a "break-away" feature that allows the door to be pushed open in an emergency exit situation.

-- End of Section --

SECTION B30
ROOFING
03/10

B30 GENERAL

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 Construction Criteria Base (CCB) at the Whole Building Design Guide 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 3-100-10N, *Architecture*

UFC 3-110-03, *Roofing*

UNIFIED FACILITIES GUIDE SPECIFICATIONS (UFGS)

B30 1.2 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Verification of satisfactory roofing system performance shall be 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 shall be witnessed by the Contracting Officer on all significant roof projects.

A significant roof project is a single or group of buildings greater than 15,000 square feet (1,400 m2) in size, or where extenuating circumstances of the roof project such as building use, content, safety, or visibility determine the roof design.

B30 1.2.1 Pre-Roofing Conference

Prior to beginning roofing work, the Contractor shall hold a Pre-Roofing Conference with the Contracting Officer. Attendees' shall 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 shall 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 shall 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 1.2.2 Roof Design Assurance

If the roofing project is significant (defined above) or where extenuating circumstances of the roof project such as building use, content, safety, or visibility require a roofing consultant, the Contractor shall 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 be engaged in roofing design and roofing construction as his primary endeavor. The roof consultant shall verify in writing that the design for the project is in accordance with the current edition of NRCA *Roofing and Waterproofing Manual*, UFC's, and RFP, and standard industry practices and building codes.

If a Roof Design Assurance Consultant is needed, consider using a Registered Roof Observer as a QC specialist in UFGS Section 01 45 00.05 20, *Design and Construction Quality Control*.

B30 1.2.3 Low Slope Roof Drain Test

Plug roof drains and fill with water to the edge of the drain sump for 24 hours. Not all drains shall be tested at one time. Measure water at the beginning and end of the 24 hour time period to ensure there is no leakage. Repeat testing until all leaks have been located, corrected, and no leaks found.

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) shall not foam upon contact with substrate. After foaming test is performed, test for strippability (adherence).

B30 1.2.5 Quality Control Program

Contractor shall 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 UFGS Section 01 45 00.05 20, *Design and Construction Quality Control*, is required.

B30 1.3 DESIGN SUBMITTALS

Design submittals shall be in accordance with Z10, *General Performance Technical Specifications*, UFGS section 01 33 10.05 20, *Design Submittal Procedures*, UFC 1-300-09N, *Design Procedures*and UFC 3-100-10N, *Architecture*.

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) shall 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 shall 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. Roof selection shall comply with UFC 3-330-02A, *Design: Commentary on Roof Systems*. 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 shall 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

Slope conversions from low slope to steep slope roofing systems must specifically address temporary waterproofing protection where new framing connections penetrate the existing low slope system.

B301001 1.1 SLATE ROOFING

Slate roofing systems shall be installed in accordance with NRCA Standards.

B301001 1.1.1 Warranty

Contractor shall supply manufacturer's standard warranty against defects in product workmanship and materials, including related metal flashing for a period of 30 years from the date of FINAL acceptance of the work.

B301001 1.1.2 Materials

a. Slate - Slate materials shall meet the grading standards of the National Slate Association. Field punching of slate shall be from the back of the slate.
b. Underlayment Membrane - For standard slate roofs, roofing felts shall be un-perforated asphalt-saturated felts, No. 30 or heavier. For graduated slate roofs, two layers of felts shall be applied with joints and laps staggered. When roof slopes are less than 4:12, a double layer of felt shall be applied in mastic or hot asphalt shall be applied. At the roofing perimeter, eaves, rakes, sidewalls, head walls,

valleys and all penetrations, install self-adhering membrane (3 foot band minimum) (900 mm band minimum).

c. Fastening - Nails shall be stainless steel or copper ring shank nails. Nails shall be long enough to penetrate the roof sheathing with heads of sufficient diameter to prevent pullover of slate. Slate shall hang on the shaft of the fastener, and drawn to, but not tight against the slate surface. Exposed nails on the top courses shall be sealed. In high wind areas, provide mechanical fastening plus sealant adhesive attachment. Provide screws, wire ties, hook nails, tile locks and storm clips of brass, copper or stainless steel as recommended by the manufacturer for the project.

d. Flashing - Flashings for slate roofing shall be 16 oz. (454 g) copper or 24 gage stainless steel, and 16 oz. (454 g) lead-coated copper, and shall be protected to prevent the potential for galvanic action by having contact with dissimilar metals.

e. Snow Guards - Provide snow guards of type compatible with roof system specified, and designed to meet design loads for the project location.

B301001 1.2 ASPHALT SHINGLES

The shingle roofing system shall be installed in accordance with NRCA *Roofing and Waterproofing Manual*(Latest Edition), "Steep Roofing", closed cut valley flashing shall not be allowed and per ASTM D 3462.

B301001 1.2.1 Warranties

The contractor shall furnish to the Government the manufacturer's standard 30-year warranty for the asphalt shingles. The Contractor shall also warrant that the asphalt shingle roofing system, as installed, is free from defects in workmanship. Provide a minimum 10-year fungus resistance warranty in southern climate and areas susceptible to fungus growth on shingles.

B301001 1.2.2 Materials

a. Shingles - Shingles shall meet ASTM D 3018, Type I, and ASTM D 3462, and shall weigh not less than 210 pounds per 100 square feet (95 kg per 9.3 square meters). Shingles shall meet the fire resistance requirements of UL 790 for Class 'A' and resist winds in accordance with ASCE-7 when tested in accordance with UL 997.

b. Shingle Underlayment - Asphalt-saturated felt conforming to ASTM D 226, Type I.

c. Self-Adhering Membrane - Self-adhering rubberized asphaltic membrane, a minimum of 40 mils thick. Provide at all ridges, valleys, sidewalls and starter strips.

d. Nails - 11 or 12 gauge hot-dipped galvanized steel, corrosion resistant roofing nails, with sharp points and flat heads 3/8 inch to 7/16 inch (9.5 mm to 11 mm) diameter. Shank diameter shall be a minimum of 0.105 inch (2.7 mm) to a maximum of 0.135 inch (3.4 mm). Nails shall be long enough to penetrate through all layers of roofing materials and achieve secure anchorage into a roof deck. A minimum of 4 nails shall be used on a full width shingle, and six nails in high wind areas. Location of nails shall be as shown in manufacturers printed installation instructions. Staples are not permitted as a means of attachment.

e. Asphalt Roof Cement - ASTM D 4586, Type II

f. Asphalt Primer - ASTM D 41

B301001 1.3 ROOF TILES

B301001 1.3.1 Warranty

The contractor shall warrant for 30 years that the tile roofing system, as installed, is free from defects in workmanship.

B301001 1.3.2 Materials

a. Clay Tile - ASTM C 1167, machine-formed natural clay tiles, kiln-fired to vitrification and free from surface imperfections. Provide specially shaped units as required to provide watertight installation and closure. Form fastening holes prior to firing.
b. Concrete Tile - ASTM C 1492, molded or extruded, interlocking concrete roofing tile units, and specially shaped as required to provide a watertight installation and closure. Provide with cast-in anchor lugs, transverse weather checks and fastening holes.

B301001 1.3.3 Underlayment

Underlayment type shall be determined by slope as follows:

10:12 slope and above shall have a minimum of one layer of number 30 felt, laid in shingle fashion with a minimum of a 2 inch (50 mm) lap.

4:12 to 10:12 slopes shall have a minimum of 2 layers of number 30 felt or one layer of a modified bitumen underlayment for use with standard size tile as long as tile is laid with a minimum of a 3 inch (75 mm) headlap. Underlayment shall be laid shingle fashion with a 19-inch (480 mm) lap.

Tiles shall not be laid on slopes less than 4:12.

a. Felt Underlayment - Asphalt saturated felt conforming to ASTM D 226, Type I.
b. Flexible Hip, Starter and Ridge Flashing - Provide SBS Modified rubberized asphalt adhesive on a linear, low-density polyethylene membrane with a 60 mil total thickness, or 40 mil thick self-adhered membrane underlayment in accordance with ASTM D 1970. At the roofing perimeter, eaves, rakes, sidewalls, head walls, valleys and all penetrations, install self-adhering membrane (3 foot (900 mm) band minimum).

B301001 1.3.4 Substrate Panels for Application Over Metal Deck

a. Glass Mesh Mortar Units - ASTM E 84, exterior type panels of Portland cement.
b. Fiberglass-Faced Gypsum Roof Board - ASTM 1177/C 1177M

B301001 1.3.5 Fasteners

a. Nails for Applying Felt Underlayment - Hot dip galvanized steel, 11 gage, of sufficient length to penetrate through substrate panels.

b. Materials for Installation of Tile - Nails shall be round-head, sharp point, 11 or 12 gauge, copper or stainless steel ring shank roofing nails. Nail heads shall be low profile, smooth and flat. Shanks may be smooth, barbed or otherwise deformed for added pull out resistance. Nails should be of sufficient length to penetrate one inch (25 mm) into wood ridge and hip boards, or battens, with heads of sufficient size to prevent pullover of the tile.
1) Wind Locks shall be of 10 gage copper or brass, 12 gage galvanized steel, or 0.084 inch (2.1 mm) stainless steel formed wire clips.

2) Provide hurricane clips with two nail holes in the horizontal leg for anchorage to deck or substrate.

3) Provide dual means of attachment of tile as follows, or as recommended by the tile manufacturer: Mechanical fastening plus hurricane clips, mechanical fastening plus foam setting, mechanical fastening plus sealant adhesive attachment of tile to tile in headlap areas.

B301001 1.3.6 Preservative-Treated Lumber - AWPA C1

B301001 1.3.7 Sheet Metal Flashing and Trim

Fabricate sheet metal flashing and trim of 20 oz. Copper, lead-coated copper or stainless steel to comply with SMACNA *Architectural Sheet Metal Manual*.

B301001 1.3.8 Bird-stop for Concrete Tile

Provide 20 oz.(567 g) copper, lead or stainless steel "L" section with 3-inch (75 mm) wide horizontal leg and vertical leg cut to conform to bottom profile of tile, or provide mortar formed bird-stops with weep holes, molded plastic bird-stops, or prefabricated tiles as recommended by roofing tile manufacturer.

B301001 1.3.9 Mortar

ASTM C 270, Type M mortar mix. Mortar set tile shall not be used in high-wind areas.

B301001 1.3.10 Asphaltic Plastic Cement

ASTM D 4586.

B301001 1.3.11 Foam-set Tile

Provide foam plastic adhesive designed to meet the concrete and clay tile roofing industries requirements for adhering roofing tile to specified roof underlayment assemblies. Foam adhesive shall meet ASTM E 84, with a flame spread of less than 75. When tested in accordance with ASTM E 108, the roof covering system shall qualify as a Class 'A' roof covering system.

B301001 1.4 METAL ROOF PANELS (ARCHITECTURAL STANDING SEAM METAL ROOFS ON

SUPPORTED SUBSTRATE)

B301001 1.4.1 Manufactured Sheet Metal Roofing

Provide galvanized steel or aluminum-zinc coated steel or aluminum panels formed at the manufacturing plant and conditioned for flatness. Panel thickness shall be determined 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 greater than 16 inches (400 mm) wide. All panels greater than 12 inches (300 mm) wide shall have preformed reinforcing ribs or embossed for stiffening. The minimum gauge for aluminum panels shall be 20-gauge, .032 inch thick (.8 mm thick) or greater. Roofing design shall meet deflection and wind load requirements per building code.

The SSMR system covered under this specification shall 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 shall 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 shall 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 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 shall be not less than 20 years from the date of Government acceptance of the work. The warranty shall be issued directly to the Government. The warranty shall 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 shall be the responsibility of the

roofing system manufacturer. Repairs that become necessary because of defective materials and workmanship while roofing is under warranty shall 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. The Contractor shall also provide a 2 year contractor installation warranty. Coating shall not show a color change greater than 5 NBS color units per ASTM D2244, and not show chalking in excess of 10 per ASTM D4214.

f. Wind Uplift - Metal roofing systems 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.

B301001 1.4.2 Metal Roof Design Requirements

The design of the SSMR system shall be provided by the Contractor as a complete system. Roof panels, components, transitions, accessories, and assemblies shall be supplied by the same roofing system manufacturer. Provide to the DOR a design analysis signed by a Registered Professional Engineer employed by the SSSMR manufacturer. The design analysis shall 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 shall indicate how expected thermal movements are accommodated.

B301001 1.4.3 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 shall be manufactured or approved by the roof panel manufacturer.

B301001 1.4.4 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 1.4.5 Field Quality Control

Install in accordance with the approved manufacturer's erection instructions, shop drawings, and diagrams. Panels shall 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 shall, 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 shall allow roof to move independently of the structure, except at fixed points as necessary.

B301001 1.5 STRUCTURAL METAL ROOFING SYSTEM

B301001 1.5.1 Structural Standing Seam Metal Roof (SSSMR) System

The SSSMR system covered under this specification shall 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 shall 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.

B301001 1.5.2 Design Requirements

The design of the SSSMR system shall be provided by the Contractor as a complete system, in accordance with ASCE 7. Framing members and connections not indicated on the drawings shall be designed by the Contractor. Roof panels, components, transitions, accessories, and assemblies shall be supplied by the same roofing system manufacturer. Provide to the DOR a design analysis signed by a Registered Professional Engineer employed by the SSSMR manufacturer. The design analysis shall include a list of the design loads, and complete calculations for the support system (when provided by the Contractor), roofing system and its components; valley designs, gutter/downspout calculations, screw pullout test results, and shall indicate how expected thermal movements are accommodated.

a. Dead Loads - The dead load shall be the weight of the SSSMR system. Collateral loads such as sprinklers, mechanical and electrical systems, and ceilings shall not be attached to the panels.
b. Concentrated Loads - The panels and anchor clips shall be capable of supporting a 300 pound concentrated load. The concentrated load shall be applied at the panel mid-span and will be resisted by a single standing seam metal roof panel assumed to be acting as a beam. The un-deformed shape of the panel shall be used to determine the section properties.

c. Uniform Loads - The panels and concealed anchor clips shall be capable of supporting the minimum uniform live load specified in the project program.

d. Roof Snow Loads - The design roof snow loads shall be shown on the contract drawings.

e. Wind Loads - The design wind uplift pressure for the roof system shall be shown on the contract drawings. The design uplift force for each connection assembly shall be that pressure given for the area under consideration, multiplied by the tributary load area of the connection assembly. The safety factor listed below shall be applied to the design force and compared against the ultimate capacity. Prying shall be considered when figuring fastener design loads.

1) Single fastener in each connection.....3.0

2) Two or more fasteners in each connection...2.25

f. Framing Members Supporting the SSSMR System - New or revised framing members and their connections shall be designed in accordance with AISC 335, AISI SG-973, or SJI Specs & Tables. Maximum deflection under applied live load, snow, or wind load shall not exceed 1/180 of the span length.

g. Roof Panels Design – Deflections shall be based on panels being continuous across three or more supports. Deflection shall be calculated and measured along the major ribs of the panels.

1) Steel panels shall be designed in accordance with AISI SG-973.

2) Aluminum panels shall be designed in accordance with AA ADM. The panel deflection from concentrated loads shall not exceed 1/180 of the span length. The panel deflection under applied live load, snow, or wind load shall not exceed 1/180 times the span length.

B301001 1.5.3 Performance Requirements

a. The SSSMR shall be tested for wind uplift resistance in accordance with ASTM E 1592; SSSMR systems previously tested and approved may be acceptable.

b. SSSMRS Warranty Certificate -- At the completion of the project the Contractor shall furnish signed copies of the 5-year Warranty for Structural Standing Seam Metal Roof (SSSMR) System, a sample copy of which is attached to this section, and the 20-year Manufacturer's Material Warranties, and the manufacturer's 20-year system weather-tightness warranty.

1) Contractor's Weather-tightness Warranty

The SSSMR system shall be warranted by the Contractor on a no penal sum basis for a period of five years against material and workmanship deficiencies; system deterioration caused by exposure to the elements or inadequate resistance to specified service design loads, water leaks, and wind uplift damage. The SSSMR system covered under this warranty shall include the entire roofing system including, but not limited to, 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 shall 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, and 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 these specifications that are part of the SSSMR system. All material and workmanship deficiencies, system deterioration caused by exposure to the elements /or inadequate resistance to specified design loads, water leaks and wind uplift damage shall be repaired as approved by the DOR. See the attached Contractor's required warranty for issue resolution of warrantable defects. This warranty shall warrant and cover the entire cost of repair or replacement, including all material, labor, and related markups. The Contractor shall supplement this warranty with written warranties from the installer and system manufacturer, which shall be submitted along with Contractor's warranty; however, the Contractor shall be ultimately responsible for this warranty

2) Manufacturer's Material Warranties

The Contractor shall furnish, in writing, the following manufacturer's material warranties which cover all SSSMR system components such as roof panels, anchor clips and fasteners, flashing, accessories, and trim, fabricated from coil material:

a) A manufacturer's 20 year material warranty warranting that the aluminum, zinc-coated steel, aluminum-zinc alloy coated steel or aluminum-coated steel as specified herein will not rupture, structurally fail, fracture, deteriorate, or become perforated under normal design atmospheric conditions and service design loads. Liability under this warranty shall be limited exclusively to the cost of either repairing or replacing nonconforming, ruptured, perforated, or structurally failed coil material.

b) A manufacturer's 20 year exterior material finish warranty on the factory colored finish warranting that the finish, under normal atmospheric conditions at the site, will not crack, peel, or delaminate; chalk in excess of a numerical rating of eight, as determined by ASTM D 4214 test procedures; or change color in excess of five CIE or Hunter Lab color difference (delta E) units in accordance with ASTM D 2244. Liability under this warranty is exclusively limited to refinishing with an air-drying version of the specified finish or replacing the defective coated material.

c) A roofing system manufacturer's 20 year, non-prorated, system weathertightness warranty.

B301001 1.5.4 Roof Panels

Panels shall be steel or aluminum and shall have a factory color or mill finish. Length of sheets shall be sufficient to cover the entire length of any unbroken roof slope for slope lengths that do not exceed 30 feet. When length of run exceeds 30 feet and panel laps are provided, each sheet in the run shall extend over three or more supports. Sheets longer than 100 feet may be furnished if approved by the DOR. Width of sheets shall provide not more than 24 inches of coverage in place. SSSMR system with roofing panels greater than 12 inches in width shall have standing seams rolled during installation by an electrically driven seaming machine.

a. Steel panels

1) Steel panels shall be zinc-coated steel conforming to ASTM A 653/A 653M; aluminum-zinc alloy coated steel conforming to ASTM A 792/A 792M, AZ 55 or 50 coating; or aluminum-coated steel conforming to ASTM A 463/A 463M,Type 2, coating designation T2 65. Zinc, zinc-aluminum alloy or aluminum coated panels shall be 0.023 inch (0.584 mm) thick minimum. Panels shall be within 95 percent of reported tested thickness as noted in wind uplift resistance testing required in paragraph "PERFORMANCE REQUIREMENTS".

2) Prior to shipment, if the panels are not specified with a factory color finish, mill finish panels shall be treated with a passivating chemical to inhibit the formation of oxide corrosion products. Panels that have become wet during shipment and have started to oxidize shall be rejected.

b. Aluminum Panels - Alloy conforming to ASTM B 209, temper as required for the forming operation, minimum 0.032 inch thick.

B301001 1.5.5 Concealed Anchor Clips

Concealed anchor clips shall be the same as the tested roofing system.

B301001 1.5.6 Accessories

Flashing, trim, metal closure strips, caps and similar metal accessories shall be the manufacturer's standard products. Exposed metal accessories shall be finished to match the panels furnished.

B301001 1.5.7 Fasteners

Fasteners for steel roof panels shall be zinc-coated steel, aluminum, corrosion resisting steel, or nylon capped steel, type and size specified below or as otherwise approved for the applicable requirements. Fasteners for aluminum roof panels shall be aluminum or corrosion resisting steel. Fasteners for structural connections shall provide both tensile and shear ultimate strengths of not less than 750 pounds per fastener. Exposed roof fasteners shall be sealed or have sealed washers on the exterior side of the roof to waterproof the fastener penetration. Washer material shall be compatible with the roofing; have a minimum diameter of 3/8 inch for structural connections; and gasketed portion of fasteners or washers shall be neoprene or other equally durable elastomeric material approximately 1/8 inch thick. Exposed fasteners for factory color finished panels shall be factory finished to match the color of the panels.

a. Screws - Screws for attaching anchor devices shall be not less than No. 14
b. Bolts - Bolts shall be not less than 1/4 inch diameter, shouldered or plain shank as required, with locking washers and nuts.
c. Structural Blind Fasteners - Blind screw-type expandable fasteners shall be not less than 1/4 inch diameter. Blind (pop) rivets shall be not less than 9/32 inch minimum diameter.

B301001 1.5.8 Sub-purlins

Cold formed supporting structural members/sub-purlins shall have a minimum thickness of 0.059 inches and a minimum tensile yield strength of 50000 psi. Hot rolled structural members shall have a minimum thickness of 0.25 inches and a minimum tensile yield strength of 36000 psi. Sub-purlins shall be galvanized or shop painted, as required by the project program.

B301001 1.5.9 Factory Color Finish

Panels shall have a factory applied polyvinylidene fluoride finish on the exposed side. The exterior finish shall consist of a baked-on topcoat with an appropriate prime coat. The exterior coating shall be a nominal 2 mil thickness consisting of a topcoat of not less than 0.7 mil dry film thickness and the paint manufacturer's recommended primer of not less than 1.0 mil thickness. The interior color finish shall consist of the same coating and dry film thickness as the exterior. The exterior color finish shall meet the test requirements specified below.

a. Salt Spray test - A sample of the sheets shall withstand a cyclic corrosion test for a minimum of 2016 hours in accordance with ASTM D 5894, including the scribe requirement in the test. Immediately upon removal of the panel from the test, the coating shall receive a rating of not less than 10, no blistering, as determined by ASTM D 714; 10, no rusting, as determined by ASTM D 610; and a rating of 6, over 21/16 to 1/8 inch failure at scribe, as determined by ASTM D 1654.
b. Formability Test - When subjected to testing in accordance with ASTM D 522 Method B, 1/8 inch diameter mandrel, the coating film shall show no evidence of cracking to the naked eye.
c. Humidity Test - When subjected to a humidity cabinet test in accordance with ASTM D 2247 for 1000 hours, a scored panel shall show no signs of blistering, cracking, creepage or corrosion.
d. Impact Resistance - Factory-painted sheet shall withstand direct and reverse impact in accordance with ASTM D 2794 0.500 inch diameter hemispherical head indenter, equal to 1.5 times the metal thickness in mils, expressed in inch-pounds, with no cracking.
e. Abrasion Resistance Test - When subjected to the falling sand test in accordance with ASTM D 968, Method A, the coating system shall withstand a minimum of 2.83 cubic feet (80 liters) of sand before the appearance of the base metal. The term "appearance of base metal" refers to the metallic coating on steel or the aluminum base metal.
f. Specular Gloss - Where considerations for flight line visibility (or other considerations) mandate, finished roof surfaces shall have a specular gloss value of 10 or less at an angle of 85 degrees or 30 plus or minus the value specified in the project program at 60 degrees when measured in accordance with ASTM D 523.
g. Pollution Resistance - Coating shall show no visual effects when covered spot tested in a 10 percent hydrochloric acid solution for 24 hours in accordance with ASTM D 1308.

B301001 1.5.10 Insulation

Thermal resistance of insulation shall be not less than the R-values shown on the contract drawings. R-values shall be

determined at a mean temperature of 75 degrees F in accordance with ASTM C 518.

a. Polyisocyanurate Rigid Board Insulation for Use Above a Roof Deck - Polyisocyanurate insulation shall conform to ASTM C 1289, Type II.
b. Blanket Insulation - Blanket insulation shall conform to ASTM C 991.
c. Glass Mat Gypsum Roof Board - Glass mat gypsum roof board for use above the deck or insulation for thermal protection shall have a flame spread - 0, smoke developed - 0, shall be water resistant and have a compressive strength of 500 psi. Glass mat gypsum roof board shall conform to ASTM C 1177/C 1177M.

B301001 1.5.11 Sealant

Sealants shall be elastomeric type containing no oil or asphalt. Exposed sealant shall be colored to match the applicable building color or clear and shall cure to a rubber like consistency. Sealant placed in the roof panel standing seam ribs shall be provided in accordance with the manufacturer's recommendations.

B301001 1.5.12 Vapor Retarder

a. Vapor Retarders as Integral Facing - Alloy conforming to ASTM B 209, temper as required for the forming operation, minimum 0.032 inch thick. Insulation facing shall have a permeability of 0.02 perm or less when tested in accordance with ASTM E 96.
b. Vapor Retarders Separate from Insulation - Vapor retarder material shall be polyethylene sheeting conforming to ASTM D 4397. A single ply of 10 mil polyethylene sheet; or, at the Contractor's option, a double ply of 6 mil polyethylene sheet shall be used. A fully compatible polyethylene tape with equal or better water vapor control characteristics than the vapor retarder material shall be provided. A cloth industrial duct tape in a utility grade shall also be provided to use as needed to protect the vapor retarder from puncturing.
c. Slip Sheet for Use With Vapor Retarder - Slip sheet for use with vapor retarder shall be a 5 lb. per 100 square feet rosin-sized, unsaturated building paper.

B301001 1.5.13 EPDM Rubber Boots

Flashing devices around pipe penetrations shall be flexible, one-piece devices molded from weather-resistant EPDM rubber. Rubber boot material shall be as recommended by the manufacturer. The boots shall have base rings made of aluminum or corrosion resisting steel that conform to the contours of the roof panel to form a weather-tight seal.

B301001 1.5.14 Prefabricated Curbs and Equipment Support

Prefabricated curbs and equipment supports shall be of structural quality, hot-dipped galvanized or galvanized sheet steel, factory primed and prepared for painting with mitered and welded joints. Integral base plates and water diverter crickets shall be provided. Minimum height of curb shall be 8 inches above finish roof. Curbs shall be constructed to match roof slope and to provide a level top surface for mounting of equipment. Curb flange shall be constructed to match configuration of roof panels.

Curb size shall be coordinated, prior to curb fabrication, with the mechanical equipment to be supported. Strength requirements for equipment supports shall be coordinated to include all anticipated loads. Flashings shall not be rigidly attached to underline structure.

B301002 LOW SLOPE ROOF SYSTEMS

B301002 1.1 GENERAL REQUIREMENTS

a. Warranty (Except SSSMRS) - Furnish the roofing system manufacturer's materials and workmanship warranty for the roofing system. The warranty period shall not be less than 20 years from the date the Government acceptance of the work. The warranty shall be issued directly to the Government and shall not be limited in dollar value. The system warranty shall include roofing membrane, insulation, flashings, accessories and attachments.
b. Wind Uplift - The complete roof covering assembly shall be rated in accordance with FM P7825, capable of withstanding an uplift pressure as determined by ASCE-7, and FM I-49 for perimeter and flashing attachment.
c. Fire Safety - The complete roof covering assembly shall meet ASTM E 108, Class 1A or UL 790, Class A; and be listed as Fire-Classified roof deck construction in the UL RMSD, or Class I roof deck construction in FM P7825. All components of the system shall be UL labeled. Complete roof covering assembly shall:1) Be Class A or B rated in accordance with ASTM E 108 , FM 4470, or UL 790; and2) Be listed as part of Fire-Classified roof deck construction in UL RMSD, or Class I roof deck construction in FM P7825c.
d. Traffic Pads - Provide on roof system to protect roof from foot traffic. Provide traffic pads from roof access to and around roof mounted mechanical equipment and underneath removable mechanical equipment access panels. Traffic pads shall be of compatible material to roof.

B301002 1.2 BUILT-UP ASPHALT ROOFING (AGGREGATE SURFACED)

This paragraph covers the requirements for aggregate surfaced bituminous built-up roofing made up of glass felt, asphalt bitumen, and aggregate surfaced or modified bitumen cap sheet.

B301002 1.2.1 Materials

a. Asphalt - ASTM D 312, Type II, III or IV
b. Felts - Base Sheet (GB) – ASTM D 4601, Type II without perforations

1) Ply Felt (GA) – ASTM D 2178, Type IV or VI

2) Ventilating Base Sheet VB) – ASTM D 4897

3) Flashing Felt (SBS Modified Base Sheet - MB) per ASTM D 6162 (with combined polyester and glass fiber reinforcing), Type II, Grade G (weighing 4.3(90 lbs./100sf), and a thickness of 130 mils) or Grade S (weighing 58 lbs./100sf and a thickness of 85 mils), ASTM D 6163 (with glass fiber reinforcing), Type II, Grade G (weighing 90 lbs./100sf, and a thickness of 130 mils) or S (weighing 58 lbs./100sf and a thickness of 85 mils), ASTM D 6164 (with polyester reinforcing), Type II, Grade G (weighing 90 lbs./100sf, and a thickness of 130 mils) or S (weighing 70 lbs./100sf and a thickness of 115 mils).

4) SBS Bitumen Cap Sheet (RSS) – ASTM D 6162 (with combined polyester and glass fiber reinforcing), Type II, Grade G (weighing 90 lbs./100sf, and a thickness of 130 mils), ASTM D 6163 (with glass fiber reinforcing), Type II, Grade G (weighing 90 lbs./100sf, and a thickness of 130 mils), ASTM D 6164 (with polyester reinforcing),

c. Primer - ASTM D 41
d. Asphalt Roof Cement - ASTM D 4586, Type II for vertical surfaces and Type I for horizontal surfaces.
e. Aggregate for Surfacing Built-up Roofing - ASTM D 1863
f. Fasteners - Provide metal fasteners of copper, aluminum or stainless steel, compatible with materials to be penetrated. Fasteners shall be of sufficient length to achieve appropriate embedment or penetration into the substrate below.
g. Metal Discs - Flat discs or caps of zinc-coated steel not less than 28 gage and not less than 1-3/8 inches (35 mm) in diameter.
h. Traffic Pads - Preformed reprocessed rubber, compatible with the roof membrane, 1/4-inch (6.35 mm) minimum thickness, weighing not less than 1-1/2 pounds per square foot, to protect roof from foot traffic. Provide traffic pads around roof access and around roof mounted equipment and underneath removable mechanical equipment access panels.

B301002 1.2.2 FIELD QUALITY CONTROL

a. Tests for Surface Dryness - see paragraph B301002 1.2 for Performance Verification and Acceptance Testing requirements.

B301002 1.3 ETHYLENE PROPYLENE DIENE MONOMER (EPDM)

B301002 1.3.1 Materials

a. EPDM Sheet - ASTM D 4637.Â Ethylene Propylene Diene Monomer (EPDM), reinforced, 0.06 inch (1.5 mm) thick for fully adhered application. Seams shall be sealed with seam tape versus liquid adhesive, unless previously approved by DOR.
b. Flashing and Flashing Accessories - Flashing, including perimeter flashing, flashing around roof penetrations, and prefabricated pipe seals, shall be 0.06 inch (1.5 mm) minimum thick uncured EPDM sheet or 0.045 inch (1.1 mm) minimum thick cured EPDM.
c. Fasteners - Provide fasteners warranted by the roofing manufacturer for the EPDM sheet installation.
d. Roof Insulation - Provide rigid board insulation beneath the EPDM sheet as part of the warranted roof system, and compatible with the adhesive used in the installation.

B301002 1.4 MODIFIED BITUMINOUS MEMBRANE ROOFING

This paragraph covers the requirements for modified bituminous membrane sheet roofing, SBS modified for hot mopping or cold applied, with a minimum slope of 1/2 inch per foot. Contractor shall provide a complete modified bitumen roofing system, to include insulation, flashings, felts, primers and adhesives as recommended for the installation either on a nailable (plywood or metal deck) or non-nailable (concrete) substrate, from the materials below.

B301002 1.4.1 Materials

a. Asphalt - ASTM D 312, Type III or IV.
b. Ply Materials -

1) Ventilating Base Sheet (VB) – ASTM D 4897, Type II

2) Base Sheet (GB) – ASTM D 4601, Type II without perforations

3) SBS Modified Base Sheet (MB) – ASTM D 6162 (with combined polyester and glass fiber reinforcing), Type II, Grade S weighing 58 lbs./100sf and a thickness of 85 mils), ASTM D 6163 with glass fiber reinforcing), Type II, Grade S (weighing 58 lbs./100sf and a thickness of 85 mils), ASTM D 6164 (with polyester reinforcing), Type II, Grade S (weighing 70 lbs./100sf and a thickness of 115 mils).

4) SBS Interply Sheet: ASTM D 6162, ASTM D 6164, ASTM D 6163, Type I or II, Grade S, minimum 80 mils (2.0 mm) thick.

5) SBS Bitumen Cap Sheet (RSS) – ASTM D 6162 (with combined polyester and glass fiber reinforcing), Type II, Grade G (weighing 90 lbs./100sf, and a thickness of 130 mils), ASTM D 6163 (with glass fiber reinforcing), Type II, Grade G (weighing 90 lbs./100sf, and a thickness of 130 mils), ASTM D 6164 (with polyester reinforcing), Type II, Grade G (weighing 90 lbs./100sf, and a thickness of 130 mils). Provide polyester reinforced cap sheet on roofs expected to experience high levels of traffic, on roofs with congested equipment, where equipment is expected to receive regular service or high maintenance, and where other service conditions warrant.

c. Mineral Roofing Granules - Factory applied, requiring no further coating.
d. Primer - ASTM D 41
e. Asphalt Roof Cement - ASTM D 4586, Type II for vertical surfaces, Type I for horizontal surfaces.
f. Fasteners - Provide non-corrosive fasteners meeting the requirements of FM A/S4470.
g. Asphalt Adhesive - ASTM D 4479, Type III.
h. Reflective Coating - 100% Acrylic Elastomeric with Energy Star Rating exceeding the requirements of ASTM D-6083. Coating shall be intended for use as a roof topcoat.

B301002 1.5 STRUCTURAL STANDING SEAM METAL ROOFING

See B301001 1.5.1 "Structural Standing Seam Metal Roof System" for SSSMR requirements.

B301003 ROOF INSULATION & FILL

The insulation system shall be coordinated 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 shall be non-combustible and shall 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 the roofing systems.

B301003 1.2.1 Insulation Types

Roof insulation shall have an R-value determined per ASHRAE Standard 90.1 (latest edition) 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 roof system:

a. Expanded Perlite Board - ASTM C 728, minimum thickness of 3/4" boards, and 4' by 4' board size.

b. 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 shall be restricted to 4' by 4' when applied in direct contact with concrete deck.

c. Composite Boards - ASTM C 984 (Polyisocyanurate-perlite) or ASTM C 1050 (Polystyrene-wood fiberboard), Type III, Grade 1, Class A, or ASTM C 1289, Type V, oriented strand board or waferboard on one side and fibrous felt or glass fiber mat membrane or aluminum foil on the other.

d. Wood Fiber (high density) - ASTM C 208

B301003 1.2.2 Tapered Roof Insulation

On portions of the roof where the sloping of structure does not allow the minimum slopes, provide a factory tapered roof insulation system to provide positive drainage of roof system, and to include drainage around curbs, penetrations, and projections through the roof plane. For new construction, provide one layer of the tapered roof insulation assembly factory tapered to a slope not less than 1/2" per foot (13 mm per 300 mm). For re-roofing applications where slopes of 1/2" per foot (13 mm per 300 mm) cannot be achieved, provide a minimum of 1/4" per foot (6.35 mm per 300 mm) slope.

B301003 1.2.3 Protection Board

Provide for use as a thermal barrier (underlayment) or protection board for hot-mopped applications.

B301003 1.2.4 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 1.2.5 Bitumens

a. Asphalt Primer - ASTM D 41
b. Asphalt - ASTM D 312, Type III or IV
c. Asphalt Roof Cement - ASTM D 4586, Type I for horizontal surfaces, Type II for vertical and sloped surfaces. Roof cement shall be compatible with membrane materials.

B301003 1.2.6 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 1.2.7 Seal at Penetrations

Provide pre-manufactured flashing components for use in single-ply roofing applications. Seal laps and penetrations to prevent moisture vapor penetration. Adhesives, sealants, prefabricated components and spray foam products may be required.

B301003 1.2.8 Fasteners

Fasteners shall 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 shall 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 shall be not less than 40 lbs.(18 kg) each, or 120 lbs. (54 kg) each in metal deck.

Fasteners in steel decks shall be hardened fasteners or screws conforming to FM A/S4470 and listed in FM P7825 for Class I roof deck construction.

Fasteners shall be place to withstand an uplift pressure required by the project program in the field of the roof and FM 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 shall 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 1.2.9 Wood Nailers

Wood nailers shall 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 1.2.9.1 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. Flashing and sheet metal shall be provided 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. Copper, Sheet and Strip - ASTM B 370, cold-rolled temper.
b. Lead-Coated Copper Sheet - ASTM B 101
c. Lead Sheet - Minimum weight 4 pounds per square foot (.19 kPa).
d. Steel Sheet, Zinc-Coated (Galvanized) - ASTM A 653/ A 653M. Galvanized steel items shall have a baked-on, factory applied finish of polyvinylidene fluoride or an equivalent fluorocarbon coating with a minimum thickness of 0.8 to 1.3 mils.
e. Stainless Steel - ASTM A 167, Type 302 or 304, 2D finish, fully annealed, dead-soft temper.
f. Aluminum Alloy Sheet and Plate - ASTM B 209
g. Pre-Finished Aluminum - Provide trim, gravel stops and fascias of Pre-finished aluminum. Finish shall 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.
h. Aluminum alloy, Extruded Bars, Rods, Shapes, and Tubes - ASTM B 221
i. Solder - ASTM B 32
j. Polyvinyl Chloride Reglet - ASTM D 1784, Type II
k. Asphalt Primer - ASTM D 41
l. Fasteners - Fasteners shall be of the same or compatible metal with the item being fastened. Stainless steel fasteners shall be used to fasten dissimilar materials.

B301004 1.1.2 Field Quality Control

Fabrication and installation of sheet metal items shall 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 shall be 12 inches (300 mm), maximum length shall be 18 inches (450 mm).

e. Sheet metal shall be fabricated to conform to the contours of surfaces to which applied.

f. All sheet metal cap flashings shall 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 shall 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 shall be sized per applicable Plumbing and Building Codes. Finish shall 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.

B301006 ROOF OPENINGS AND SUPPORTS

B301006 1.1 GENERAL REQUIREMENTS

Provide flashings for roof openings and supports as recommended by the NRCA and as specified below:

When existing pitch pans cannot be avoided and must be utilized, insure pitch pan is a preformed pan with minimum 4-inch (100 mm) height and 2-inch (50 mm) flange with 2-inch (50 mm) clearance on all sides of the penetration. Fill bottom 1/3 with non-shrink grout. Fill remainder with pourable elastomeric sealer sloped to drain. For round penetrations, provide a metal umbrella cap clamped to the penetration.

Assure all penetration flashings extend minimum 8 inches (200 mm) above the finished roof surface. Use round shapes to construct equipment supports. Equipment supports should be raised on a continuous curb a minimum of 14 inches (350 mm), but not less than as required by the NRCA.

B301006 1.2 ROOF HATCHES

Construct using NRCA approved techniques and details. Provide roof hatch where required by OSHA, or as access to roof when roof mounted equipment is used or other routine roof maintenance is required.

B301006 1.2.1 Construction

Provide insulated roof hatches of 14 gage galvanized steel with 22

gage galvanized steel liner or 18 gage aluminum liner, and have integral curb, flange and flashings for securing to roof deck. Hinge shall be heavy-duty zinc plated steel with non-removable pins. Latching mechanism shall be zinc-coated steel slam latch with inside and outside levers. Springs shall be greased compression springs in telescopic tubes. Provide interior locking of roof hatch. Provide a safety rail or ladder extension. Size roof hatch to allow access of routine maintenance equipment, but not less than 2'-6" x 3'-0" (750 mm x 900 mm). Hatch and access ladders shall conform to OSHA and other applicable safety standards.

B301006 1.3 GLAZED ROOF OPENINGS

This paragraph covers the requirements for skylights manufactured from glass-fiber or thermoplastic carbonate.

Skylights and other glazed roof openings shall be used only to supplement interior lighting levels (generally in steep slope or vertical applications), and otherwise, are discouraged from use. Proper detailing is critical, and shall be scrutinized closely to minimize the likelihood of future leaks at these locations.

B301006 1.3.1 Warranty

The contractor shall furnish to the Government the manufacturer's complete warranty for materials, workmanship and installation. The warranty is for 10 years from the time of project completion. The warranty shall guarantee, but shall not be limited to, the following:

a. Light transmission and color of the panels shall not change after exposure to heat of 300 degrees F (149 degrees C) for 25 minutes.
b. There is no delamination of the panel affecting appearance, performance, weatherability or structural integrity of the panels or the completed system.
c. There is no fiberbloom on the panel face.
d. Change in light transmission of no more than 6% per ASTM D 1003, and in color (yellowing index) no more than 10 points in comparison to the original specified value over a 10 year period.

B301006 1.3.2 Skylight Panels

Skylight panels shall be constructed of glass-fiber reinforced polyester or extruded cellular thermoplastic polycarbonate materials. Glass-fiber reinforced panels shall conform to ASTM D 3841 and to the requirements of AAMA 1600/I.S.7.

a. Non-Combustible Grid Core - The aluminum I-beams shall be 6063-T6 with provisions for mechanical interlocking of muntin-mullion and perimeter to provide full bonding surface to contact the face material. Panels shall withstand 1200 degrees F (650 degrees C) for a minimum of one hour without collapse or exterior flaming.
b. Adhesive - The laminate adhesive shall meet the following requirements:1) Tensile strength of 750 psi-in. in accordance with ASTM C 297.2) Shear strength shall meet or exceed the following per ASTM D 1002:a) 540 psi (3723 kPa) at 50% relative humidity and 73 degrees F (23 degrees C).b) 800 psi (5516 kPa) under accelerated aging per ASTM D 1037

at room temperature.c) 250 psi (1724 kPa) under accelerated aging per ASTM D 1037 at 182 degrees F (83 degrees C).d) 1400 psi (9653 kPa) after 500 hour Oxygen Bomb per ASTM D 572.e) 100 psi (690 kPa) at 182 degrees F (83 degrees C).

c. Panel Construction - Panels shall consist of fiberglass faces laminated to an aluminum I-beam grid core and shall not deflect more than 1.9 inches (48 mm) at 30 psf (1.44 kPa) in 10 feet (3.048 meters) per ASTM E 72, without a supporting frame.

B301006 1.3.3 Thermoplastic Polycarbonate Panels

The glazing panels shall meet the following requirements:

a. The interior flame spread classification shall be Class I in accordance with ASTM E 84, with a smoke developed rating no greater than 70 in accordance with ASTM D 2843.
b. The exterior and interior faces shall be an approved light transmitting panel with a CC1 fire rating classification in accordance with ASTM D 635.
c. Self-ignition shall be greater than 1058 degrees F (570 degrees C) in accordance with ASTM D 1929.
d. Fire rated roof assembly translucent panels shall be successfully evaluated for fire from exterior exposure per ASTM E 108 to meet Class 'A' rating, and be listed by an independent recognized listing laboratory.

B301006 1.4 GUARDS

Provide rails or guards as required by the OSHA, the International Building Code or other applicable safety standards.

B301090 OTHER ROOFING

B301090 1.1 LIGHTNING PROTECTION

Lightning protection component penetrations and attachments shall 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 shall be set on roof surface cleaned of aggregate and loose material prior to mastic application.

B301090 1.2 ROOF DRAINS (EXISTING)

Where existing roof drains are to be reused in roof replacement construction, the contractor shall provide new, compatible flashing materials, a new drain clamping ring and new bolts for anchorage. Reuse of existing clamping ring and bolts is unacceptable.

-- 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 SHALL INCLUDE, BUT

SHALL 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 SHALL BE REPAIRED AS APPROVED BY THE CONTRACTING OFFICER. THIS WARRANTY SHALL COVER 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)

Warranty page 2

CONTRACTOR'S FIVE (5) YEAR NO PENAL SUM WARRANTY FOR STRUCTURAL STANDING SEAM METAL ROOF (SSSMR) SYSTEM (continued)

THE CONTRACTOR SHALL SUPPLEMENT THIS WARRANTY WITH WRITTEN WARRANTIES FROM THE MANUFACTURER AND INSTALLER OF THE SSSMR SYSTEM, WHICH SHALL BE SUBMITTED 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. CONTRACTOR'S DESIGN SHALL INSURE FREE DRAINAGE FROM THE ROOF AND NOT ALLOW PONDING WATER.

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.

**

Warranty page 3

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 SHALL 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 SHALL BE INITIATED IMMEDIATELY; A WRITTEN PLAN SHALL BE SUBMITTED FOR APPROVAL TO REPAIR OR REPLACE THIS SSSMR SYSTEM WITHIN SEVEN (7) CALENDAR DAYS. ACTUAL WORK FOR PERMANENT REPAIRS OR REPLACEMENT SHALL 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 SHALL, WITHIN TEN (10) DAYS, JOINTLY REQUEST A LIST OF FIVE (5) ARBITRATORS FROM THE FEDERAL MEDIATION AND CONCILIATION SERVICE. THE PARTIES SHALL 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 SHALL BE THE DULY SELECTED ARBITRATOR. THE COSTS OF THE ARBITRATION, INCLUDING THE ARBITRATOR'S FEE AND EXPENSES, COURT REPORTER, COURTROOM OR SITE SELECTED, ETC., SHALL BE BORNE EQUALLY BETWEEN THE PARTIES. EITHER PARTY DESIRING A COPY OF THE TRANSCRIPT SHALL 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 SHALL BE POSTED IN THE MECHANICAL ROOM OR OTHER APPROVED LOCATION DURING THE ENTIRE WARRANTY PERIOD.

Warranty page 4

SECTION C10

INTERIOR CONSTRUCTION
03/10

C10 GENERAL

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 Construction Criteria Base (CCB) at the Whole Building Design Guide 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, *General Building Requirements*

UFC 3-100-10N, *Architecture*

UFC 3-120-10, *Interior Design*

C10 1.2 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Verification of satisfactory interior construction assemblies' performance shall be via Performance Verification Testing, as detailed in this section of the RFP. Provide special tests and special inspections in accordance with UFGS Section 01 45 00.05 20, *Design and Construction Quality Control*. The Contractor shall pay the cost of all testing.

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 per ASTM C 1019.

C10 1.2.2 Door Closure Field Test for Demountable Partitions, Retractable Partitions, Operable Panels, and Accordion Partitions

Perform a flashlight test of all joints in partitions and partition to wall, floor, and ceiling. No light from a flashlight shall be visible from the opposite side of the partition. Adjust partition at locations where light is visible, and re-test.

C10 1.2.3 Field Test for Sprayed Fire-Resistive Materials

A qualified testing and inspection agency shall be engaged to prepare testing and adhesion reports to test for bond strength. Bond strength shall be tested per ASTM E 736 and be found to meet the requirements in UL's *Fire Resistance Directory*for coating materials.

C10 1.3 DESIGN SUBMITTALS

Design submittals shall be in accordance with Z10, *General Performance Technical Specifications*, UFGS section 01 33 10.05 20, *Design Submittal Procedures*, UFC 1-300-09N, *Design Procedures*, UFC 3-100-10N, *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) shall 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

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 shown 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, except where demountable or retractable partitions are specifically required by the "Room Requirements", to include wood or metal studs, GWB, plaster, masonry and cast-in-place concrete walls. Sound-rated partition assemblies shall 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, ACI 117 and 301/301M. Concrete Mix Design shall be suitable for the job conditions.

C101001 1.2 MASONRY PARTITIONS

Accomplish work in accordance with ACI 530.1/ASCE 6/TMS 602 and associated ASTM Standards for concrete masonry wall construction.

C101001 1.2.1 Testing

Masonry strength shall be determined 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 shall be sufficiently rough to provide bond and exposed surfaces of units shall 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 shall 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 Glazed Structural Clay Tile

Provide glazed tile of Grade S, Type I, conforming to ASTM C 126. Tile for fire-rated walls shall have the percent of solid required for that rating.

C101001 1.2.2.3 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 1.2.2.4 Glass Masonry Units

Provide glass block units made of clear colorless glass with polyvinyl butyl edge coating. Provide all aggregates, horizontal and vertical joint reinforcing, panel anchors, and expansion strip as recommended by the glass block manufacturer.

C101001 1.2.3 Masonry Partition Materials

a. Mortar - Provide ASTM C 270, Type N or S for non-shear-wall interior masonry. For Glass Block use Type S, White Portland cement.
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 per ASTM C 1019.

C101001 1.2.4 Masonry Accessories

a. Horizontal Joint Reinforcement – Fabricate from cold drawn steel wire, ASTM A 82. Wire shall 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

Cold-Formed Metal Framing shall be designed and constructed in accordance with the provisions of UFC 1-200-01 and the International Building Code.

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 per 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, all rough carpentry shall be concealed 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 shall 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 shall 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.

C101002 DEMOUNTABLE PARTITIONS

This paragraph covers unitized/component based demountable walls/partitions and associated work, including tracks and anchoring systems. Requirements and configurations shall be in accordance with the project requirements. Majority of the components and hardware shall be provided by a single manufacturer and on the manufacturer's current GSA pricelist.

C101002 1.1 PERFORMANCE REQUIREMENTS

C101002 1.1.1 Product Construction

Panels and framework shall be unitized/component based(not stick built), and non-progressive. All panel components including frames, glass frames, door frames, base trim, ceiling trim, and tracks shall be cold-formed steel or extruded aluminum and powder coated. Panels shall be a minimum of 2-1/4" thick, and shall have panels available between 6"-48" with 1/16" minimum with nominal widths and filler panels available. Panels shall have no more than a Â¼" reveal between adjacent panels or the use of connectors in the same finish of the skin. Panels shall have integrated leveling devices and have a minimum of Â½" adjustability at the ceiling and 1" of adjustability at the floor. Walls shall be capable of hanging any manufacturer's systems furniture. Walls must meet seismic requirements when applicable.

C101002 1.1.2 Surface Skin

Wall surfaces to be available including fabric, wood veneer, plastic laminate, painted MDF, glass, plexi-glass, resin, dry erase board, metal, and custom paint, with the option of being be segmented or monolithic. Surfaces all be interchangeable with the ability to apply a new skin/finish.

C101002 1.1.3 Door Assemblies

Doors shall be a minimum of 1-3/4" thick and available as a hinged or pivot door with the option of being a single or double doors, and with or without glass. All hardware to be included. Door and Frame assemblies shall be aligned and fitted, and securely anchored to partitions.

C101002 1.1.4 Glazing

Comply with the Federal Safety Standard for Architectural Glazing Materials and shall be factory installed. Options shall include clear, frosted, patterned, custom etched, back painted, and available for use on panels and doors.

C101002 1.1.5 Burning Characteristics and Fire Endurance

The system shall have a Class 'A' (under 25) flame spread rating in conformance with ASTM E 84.

Provide fabric and lining with a flame spread rating of 25 or less, fuel contribution rating of 15 or less, and a smoke generation of 50 or less when tested in accordance with ASTM E 84.

C101002 1.1.6 Field Test

Perform field tests as required in Paragraph C30 1.2 PERFORMANCE VERIFICATION AND FIELD TESTING.

C101002 1.2 WIRE MESH PARTITIONS

Wire mesh partitions shall be complete with all items necessary for a useable, and rigid installation. Provide pre-manufactured assemblies with pre-bolted connections. Wire mesh partition doors require a means of locking. Key and cylinder locks are required for partition doors used daily.

C101002 1.2.1 Materials

a. Steel shapes, plates and bars - ASTM A 36/ A 36M.

b. Cold-formed steel - AISI SG-673.
c. Wire mesh - Provide carbon steel wire with woven diamond mesh and intermediate crimping. Wire shall be 10 gauge mesh for seasonal storage, 6 gage mesh for protection of equipment and tools.

C101003 RETRACTABLE PARTITIONS

This paragraph covers all retractable partitions and associated work, including tracks and anchoring systems. Wall assemblies above retractable partitions shall provide a sound barrier equal to, or greater than, the sound rating of the partition.

C101003 1.1 PERFORMANCE REQUIREMENTS

The retractable partitions below shall meet the following performance requirements.

C101003 1.1.1 Burning Characteristics

The system shall have a Class 'A' (under 25) flame spread rating in conformance with ASTM E 84.

C101003 1.1.2 Fire Endurance

Provide fabric and lining with a flame spread rating of 25 or less, fuel contribution rating of 15 or less, and a smoke generation of 50 or less when tested in accordance with ASTM E 84.

C101003 1.1.3 Acoustical Performance

Sound-rated partition assemblies shall 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.

C101003 1.1.4 Electrical Requirements

Electrically powered partitions shall be controlled by electrical switches located in the room where the partitions are stored. Electrical outlets shall be tied to the building electrical power system through over-head or end-mount base feeds.

C101003 1.1.5 Door Closure Field Test

Perform field tests as required in Paragraph C30 1.2 PERFORMANCE VERIFICATION AND FIELD TESTING.

C101003 1.2 PARTITION MATERIALS

a. Aluminum Extrusions - ASTM B221, Alloy 3003
b. Steel Sheets - ASTM A 653 / A653M
c. Fabric Coating - CFFA-W-101-B, Type II

C101003 1.2.1 OPERABLE PANEL PARTITIONS

Operable panel partitions shall be factory finished, supported from an overhead track without floor guides, and complete with hardware, track, and accessories necessary for operation.

a. Suspension System - shall consist of steel or heavy duty extruded aluminum track connected to the structural system by threaded rods, and trolleys designed to support the weight of the partition. Provide steel track of 16 gage minimum, phosphate treated and finished, or zinc or cadmium coated, or provide extruded aluminum track with minimum thickness of 1/8 inch (3.2 mm). Tracks shall have an integral ceiling guard. Trolleys shall have at least two ball bearing nylon or steel tired wheels spaced according to manufacturer's design criteria and four at an end post.

C101003 1.2.2 ACCORDION PARTITIONS

Provide full accordion type partitions, factory finished, supported from overhead track without floor guides, and complete with hardware, track, and accessories necessary for operation.

Suspension System – shall consist of steel or aluminum track and trolleys designed to support the weight of the partition. Provide steel track of 16 gage minimum, phosphate treated and finished, or zinc or cadmium coated, or provide extruded aluminum track with minimum thickness of 1/8 inch (3.2 mm). Tracks shall have an integral ceiling guard. Trolleys shall have at least two ball bearing nylon or steel tired wheels spaced according to manufacturer's design criteria and four at an end post.

C101003 1.2.3 CUBICLE TRACK AND HARDWARE

Provide heavy-duty ceiling surface mounted tracks except in ceiling heights over nine feet, hanger mounted tracks may be used, with stainless steel fasteners. Track bends shall be a minimum of 18 inches radius.

C101003 1.2.3.1 Materials

a. Extruded Aluminum Track - ASTM B 221 and ASTM B 456; alloy 6063-TS, channel shape minimum 1-1/4 inch (32 mm) wide by 1-1/8 inch (29 mm) deep, 0.050 inch (1.27 mm) minimum wall thickness.
b. Carrier Unit - Provide silent type with double canted wheel carrier. Wheels shall have nylon on stainless steel hooks with swivel to support curtain. Provide 2.2 carriers for every foot of track length plus one additional carrier.

C101004 INTERIOR GUARDRAILS & SCREENS

This paragraph covers assemblies to include interior guardrails associated with open sides of floors, but not stairs' handrails. Also included are screens and associated work to include tracks and anchoring systems.

C101004 1.1 MATERIALS

a. Structural Carbon Steel - ASTM A 36/ A 36M
b. Structural Tubing - ASTM A 500
c. Steel Pipe - ASTM A 53, Type E or S, Grade B
d. Aluminum Alloy products - Products shall conform to ASTM B 209 for sheet plate, and ASTM B 221 for extrusions, and ASTM B 26/B 26M or ASTM B 108 for castings, as applicable.

C101004 1.2 FABRICATION FINISHES

C101004 1.2.1 Galvanizing

Hot-dip galvanize steel items to be exposed to water contact. Zinc-coat steel in the largest unit possible. Galvanize per ASTM A 123/ A 123M, ASTM A 153/ A 153M or ASTM A 653/ A 653M, G90, as applicable.

C101004 1.2.2 Non-Ferrous Metal Surfaces

Protect by plating, Class I anodic coatings, or 70% polyvinylidene fluoride organic coatings. See Section C30 for additional coatings/finish information.

C101004 1.3 GUARDRAILS

Design guardrails in accordance with the IBC, except delete the handrail design load reduction for code exceptions for residential, prisons, industrial, high hazard, and storage facilities. Provide materials in accordance with NAAMM PR, and provide the same size rail and post. Provide pipe collars of the same material and finish as the handrail and posts.

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 shall be a complete factory assembled unit with or without glass installed. Fabrication of window units shall comply with AAMA 101.

a. Fixed Windows - Type F, LC25 for residential, or HC40 for non-residential (commercial).
b. Sliding Glass Pass Windows - Frames and glass channels shall be of heavy type 6063-TS aluminum extrusions. Provide 1/4-inch (6.35 mm) clear tempered glass.
c. Bullet-Resistant Pass Windows - Conform to UL classification (1 through 8) as required by the installation. Provide fixed, bullet-resistant glazing with pass tray for installations requiring high levels of security.

C101005 1.2 VISION PANELS

a. Wood Windows

Wood windows shall consist of complete units, including sash, glass, frame and hardware. Window units shall meet the Grade 40 requirements of AAMA 101. Wood members that will receive a transparent finish shall be in one piece, not finger-jointed.

b. Plastic Windows

Provide PVC windows, reinforcing members, welded corners, fasteners, hardware and anchors conforming to AAMA 101 or ASTM D 4099.

1) Windows shall be fixed or operable, as stated in the project program.

2) Material and Color - Window (PVC) color shall be a consistent color all the way through the material.

c. Hollow Metal Vision Panels - shall meet the requirements of hollow metal frames, paragraph C102001.

C101005 1.3 BULLET RESISTANT WINDOWS

Windows shall meet U.L. Classification, Rating Level 1 through 8, as required for the installation and stated in the project program. Each window shall be a complete factory-assembled unit with glass factory or field installed.

C101005 1.3.1 Glazing

Provide as specified under this section, paragraph entitled "Interior Glazing."

C101005 1.3.2 Setting Materials

Provide types required for the glazing applicable setting method specified in the GANA Glazing Manual. If sealants are employed, use elastomeric sealants, ASTM C 920, Type S or M, Grade NS, Class 12.5, Use NT.

C101005 1.4 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 per 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 shall comply with ASTM E 163.

C101007 1.1.3 Patterned Glass

Type II, Class 1 (translucent), Form 3 (patterned), quality q7 (decorative), Finish f2 (patterned two sides), 1/8 inch (3.2 mm).

C101007 1.1.4 Laminated Glass

Fabricate 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. Total thickness shall be nominally 1/4 inch (6.35 mm).

C101007 1.1.5 Bullet-Resistant Glass

Provide bullet resistant composite glazing panel listed by UL ABPMED with a power rating corresponding to the installation prescribed, and in accordance with UL 752.

C101007 1.1.6 Tempered Glass

ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated), Type I, Class 1 (clear), quality q3.

C101007 1.2 PLASTIC GLAZING

C101007 1.2.1 Bullet-Resistant Plastic Sheet

Bullet resistant rating in accordance with UL 752, Class I, clear in color. Only use bullet-resistant plastic sheet on existing interior windows that cannot be removed and replaced.

C101007 1.2.2 Polycarbonate Sheet

ANSI Z97.1, Mar-resistant, Clear and smooth both sides when used for vision glazing; Translucent, textured both sides when used for obscure glazing. Mar-resistant sheet shall have a change in haze of between 5 and 8 percent under silica carbide test, 1600 grams, ASTM D 673.

Provide warranty for polycarbonate sheet glazing for a period of 5-years that includes the following:

a. Warranty Type I, Class A (UV Stabilized) sheets against breakage;
b. Warranty Type III (coated and mar-resistant) sheets against breakage and coating delamination.
c. Warranty Type IV (coated sheet) against breakage and yellowing

C101008 INTERIOR JOINT SEALANT

Sealant joint design and application shall 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 shall be paintable, and shall 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. Pools and pool decks – for vertical joints, Gun grade: ASTM C 920, Type M, Grade NS, Class 25, NT; for horizontal deck traffic joints pourable: ASTM C 920, Type M, Grade P, Class 25, T
d. Food Service – Use a Vinyl Acetate Homopolymer, or other low VOC, non-toxic sealant approved for use in food preparation areas.
e. 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

Door hardware shall be as specified in "Interior Door Hardware" in this section.

C102001 STANDARD INTERIOR DOORS

This paragraph covers all standard interior wood or hollow metal doors with frames, hardware, locks, and finish.

C102001 1.1 STEEL DOORS

Hardware preparation shall be in accordance with SDI 17, ANSI/DHI A115 and ANSI/SDI 100. Doors shall be hung in accordance with ANSI/SDI 100.

C102001 1.1.1 Standard Steel Doors

ANSI A 250.8, Level 1, (occasional use, low abuse types such as closet doors without locks); Level 2, (low use, moderate abuse types such as office/storeroom doors); Level 3, (moderate use, high abuse types such as BEQ sleeping room doors); Level 4, (high use, high abuse types such as corridors, stairways, assembly spaces, and main entry doors), with a physical performance level of 'A'. Maximum door undercut shall 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. The STC rating for the door and frame assembly shall be not less than the wall assembly STC rating.

C102001 1.1.3 Accessories

a. Shelves for Dutch doors shall comply with SDI 111-B, and be of steel not lighter than 16 gage.
b. Louver shall comply with SDI 111-C, shall be stationary, sight-proof type. Use lightproof louvers if function of room requires darkness. Louver frames shall 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 and knock-down field assembled corners for installation in metal stud and GWB partitions. Frames shall be set 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, and gypsum board compound infill at each jamb anchor in metal frame walls.

C102001 1.3 FINISHES

a. Factory-Primed Finish. Doors and frames in non-humid, non-corrosive environments shall 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 shall be compatible with door finish system in C30, Interior Coatings.

C102001 1.4 WOOD DOORS

C102001 1.4.1 Wood Doors and Frames

Install wood doors and frames according to workmanship requirements of the Architectural Woodwork Institute Quality Standard 900-T-4 Custom Grade. Wood door frames may only be used in residential construction.

For non-residential buildings provide extra-heavy doors for stairways, building entrances, corridors, assembly spaces, and other high use interior doors. Provide heavy duty doors for other non-residential locations and for residential buildings.

Wood doors shall be solid wood doors with wood core and solid wood edge bands. Vertical edge bands shall 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 shall be solid wood or structural composite lumber.

a. Stile and Rail Doors Provide premium or select grade Ponderosa pine, Douglas Fir, White Pine, or Yellow Poplar stile and rail doors conforming to WDMA I.S.6A-01. Doors shall be premium grade, heavy duty or as required by the project program.
b. Interior Flush Doors - Flush doors shall conform to WDMA I.S.6A-01. Doors shall 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, or PC-5 particleboard core construction. Do not use particleboard cores where it is anticipated that hardware may be screw mounted to the doors. 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 shall be 1/20" thick before sanding.
c. Closet Doors – Provide flush, paneled, or louvered doors of premium or custom grade, conforming to WDMA I.S.1A-01, premium or custom grade, heavy duty. Doors shall be hinged or sliding.
d. Acoustical Doors and Frames - WDMA I.S 1-A-2004 WDMA I.S.6A-01. Doors shall be premium or custom grade, heavy duty as required by the project program. Provide acoustical doors in solid core, constructed for door, hardware, and frame to provide a Sound Transmission Class (STC) rating of 39 (minimum) when tested in accordance with ASTM E 90.

C102001 1.4.2 Wood Door Accessories

a. Door Louvers - Louver shall comply with SDI 111-C. Louver frames shall 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 shall be of the same species and color of the face veneer.

C102001 1.4.3 Fabrication

a. Marking - Each door shall 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 shall 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: AWI Quality Standards Section 1500, specification for Conversion varnish, alkyd urea catalyzed polyurethane, or acrylated UV curable epoxy. The coating shall be AWI Quality Standards premium, medium rubbed sheen, with an open or closed grain effect. Poly-wrap prefinished wood doors at factory for shipping.
b. Field Finish - Prepare doors in accordance with WDMA I.S.1-A-2004. Factory prime or seal doors. Manufacturer's primer or sealer shall be compatible with door finish system in Section C30, *Interior Finishes*.
c. Plastic Laminate Finish - Factory applied, NEMA LD 3, 0.050 inch (1.27 mm) minimum thickness.

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 shall obtain hairline fit, be reinforced, and mechanically secured.

C102002 1.2.2 Aluminum Doors

Doors shall be not 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 shall have medium or wide stiles and rails. Maximum water leakage of the door and frame shall 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 shall be dressed smoothly. Exposed fasteners shall have counter-sunk heads. Weld concealed reinforcements for hardware in place. Hardware reinforcements shall be of stainless steel or steel with a hot-dipped galvanized finish, and shall 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 shall conform to AA 45, with an Architectural Class I finish, 0.7 mil or thicker. Organic coatings shall 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 NFPA 80 an NFPA 105. Fire doors and frames shall bear the label of UL, FM or WHI attesting to the rating required. Door and frame assemblies shall be tested for conformance per NFPA 252 or UL 10C (for positive pressure). Wood fire doors shall 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.

C102004 SLIDING AND FOLDING DOORS

Provide paneled or louvered closet doors of premium or custom grade, conforming to WDMA I.S.6A-01, heavy duty. Doors shall be sliding or bi-folding, as required by the program.

C102005 INTERIOR OVERHEAD DOORS

See paragraph titled "OVERHEAD AND ROLL-UP DOORS" within PTS Section B20.

C102006 INTERIOR GATES

Any special type gate installed in the interior of a facility, including frames, hardware, hoisting devices, finish, and other associated work.

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 shall 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 shall 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 ANSI/BHMA grade 1 rated hardware.

C102007 1.1.1 Hardware for Fire Doors

All hardware provided shall meet the requirements of NFPA 80 for Fire Doors and NFPA 101 for exit doors. Hardware shall 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. For residential buildings use Series 4000, Grade 2 for interior doors.

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, or Grade 2.

C102007 1.1.4 Combination Locks

BHMA A 156.2. Heavy-duty, mechanical combination lockset with 5 pushbuttons, standard-sized knob or lever, 3/4-inch (19 mm) deadlocking latch, 2-3/4 inch (70 mm) back-set. Provide deadbolt key override option. Safelock, Simplex, and Venn are acceptable manufacturers. Provide a hardware grade equivalent to Grade 1, series 4000. Provide a 5-year parts and labor warranty.

A door into a sensitive area shall be fitted with a FF-L-2740A X-09 Heavy-duty, combination Electromechanical Deadbolt lock for pedestrian doors, with a drill resistant dial ring mounting plate, 2-3/4 inch (70 mm) back-set, with Automatic Lock Reset, High-Security combination scramble, and resistant to all forms of external manipulation and environmental attack. KABA-MAS is the acceptable manufacturer. Three Modes of Operation: 1) The Single Combination Mode allows access by dialing a six-digit combination. 2) The Dual Combination Mode allows access only when two separate codes are entered within 10 seconds of one another. 3) The Supervisory/Subordinate Mode allows access by a subordinate only after a supervisor code has been entered. Audit Feature: Lock shall have a full compliment of auditing features, including non-resettable openings log, and unsuccessful attempts log (audits after 3 unsuccessful attempts) that resets once the proper access code is entered. Lock shall generate its own electrical energy with each turn of the dial, with no batteries or wires required. Lock shall be designed to fit industry standard door mounting pattern.

C102007 1.1.5 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 shall be operated simultaneously by rotating inside lever. Locks with mechanical override lock cylinders are not acceptable. Locks shall 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 shall re-lock immediately after outside lever is turned and latch retracted. Locks shall 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 shall 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 shall sound when exiting only.

System shall 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 shall be provided within 3 hours from request within the first 12 months of occupancy. Provide a 5-year parts and labor warranty.

C102007 1.1.6 Exit Devices

BHMA A 156.3, Grade 1. Touch bars shall be provided in lieu of conventional crossbars and arms. Use manufacturer's integral touch bars in aluminum storefront doors.

C102007 1.1.7 Cylinders and Cores

Provide cylinders and cores for new locks, including locks provided under other sections of this specification. Cylinders and cores shall have seven pin tumblers. Cylinders shall be products of one manufacturer, and cores shall be the products of one manufacturer. Rim cylinders, mortise cylinders, and knobs of bored locksets shall 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 1.1.8 Keying System

Provide a master key system for the facility unless more than one tenant/tenant command shall reside 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.

The Contractor shall 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 shall 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 shall 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 1.1.9 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.

C102007 1.1.10 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 1.1.11 Lock Trim

Cast, forged or heavy wrought construction and commercial plain in design.

a. Knobs and Roses - Knobs and roses shall 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 UFAS and ADAAG. All lever handles shall have the freewheeling feature.

C102007 1.1.12 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 1.1.13 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 1.1.14 Overhead Holders

BHMA A 156.8, Grade 1.

C102007 1.1.15 Closer Holder-Release Devices

BHMA A 156.15, Grade 1.

C102007 1.1.16 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 1.1.17 Door Stops and Silencers

BHMA A 156.16, Type L03011, three per single door and four per double door.

C102007 1.1.18 Thresholds

BHMA A 156.21.

C102007 1.1.19 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 1.1.20 Finishes

Provide one of the following hardware finish systems, matching the exterior hardware finish system.

a. BHMA A156.18. Hardware shall 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 shall have aluminum paint finish, and except steel hinges which shall have BHMA 652 finish (satin chromium plated). Hinges for exterior doors shall 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 shall have finish to match lock and door trim. Hardware for aluminum doors shall be finished to match the doors.
b. BHMA A156.18. Hardware shall have BHMA 612 finish (satin bronze), unless specified otherwise. Surface door closers shall have bronze paint finish. Steel hinges shall have BHMA 639 finish (satin bronze plated). Exposed parts of concealed closers shall have finish to match lock and door trim. Hardware for aluminum doors shall be finished to match the doors. Hardware showing on interior of bathrooms, shower rooms, toilet rooms, washrooms, laundry rooms, and kitchens shall have BHMA 629 finish (bright stainless steel) or BHMA 625 finish (bright chromium plated).

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 shall 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 shall 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 shall 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 shall comply with UFAS & ADAAG.

C103001 1.4 FINISHES

Finishes shall comply with FS A-A-60003. Use only one type of partition per building.

a. Metal toilet partitions and urinal screens shall be made of stainless steel.
b. Solid plastic partitions shall be fabricated of polymer resins (polyethylene) formed under high pressure forming a single component section one inch thick. Color shall 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 shall 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 shall 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 per UFAS and ADAAG.

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 shall 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 shall 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 shall 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 shall 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 shall be alloy 6063-T5 or 6063-T6, conform to ASTM B 221, and be a minimum of 0.06 inches (1.5 mm) thick.
e. Hardwood - Exposed hardwood for frames, cabinets and cases shall be oak, walnut or mahogany, with a factory applied stain and lacquer finish.
f. Glass - Provide tempered glass in accordance with ANSI Z97.1 and in conformance with ASTM C 1048.

C103003 1.2 PRESENTATION BOARD

The presentation board shall be a laminate covered wall-hung cabinet with lockable doors. Doors are to be attached to the cabinet with continuous piano hinges, and have a catch or closure to keep doors closed when not in use. The interior of the cabinet shall contain a porcelain enamel marker board writing surface with chalk-tray, a flip chart that can be hung on an interior door panel, and fabric covered tack surface on the interior door panels.

a. Marker Board - Marker board shall be a factory assembled, one-piece unit, and have a 28 gauge nominal steel porcelain enamel writing surface and a chalk-tray with end closure. Frame shall be aluminum, powder-coated steel, oak, walnut or mahogany.
b. Tack Board - Tack boards shall consist of a minimum 1/4-inch (6.35 mm) thick natural cork laminated to a minimum 1/4-inch (6.35 mm) thick hardboard, shall have an oak or aluminum frame, and be vinyl or fabric covered. Covers shall have a Class 'A' flame spread rating of 0-50, and a smoke developed rating of 0-450 in accordance with ASTM E 84.

C103004 IDENTIFYING DEVICES

This paragraph covers all signs, plaques, and traffic markers.

C103004 1.1 ASSEMBLIES

The signage system assemblies shall 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 shall 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 shall be applied, and shall 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 shall be enclosed by end caps of prefinished 6064T5 extruded aluminum. Inserts shall 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 shall be injection-molded ABS plastic with integral color. The end caps shall be interchangeable to either end of each sign type, and any other similar sign of equal height. The end caps shall be interlocking mechanically with the inserts, and rail, requiring no tools for assembly. End caps shall utilize straight corners (instead of radius corners). Spring clips shall 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 shall be provided to the signage types indicated.

C103004 1.1.4 Mounting

Mounting of the modular signage system shall 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 UFAS and ADAAG. Tactile letters and symbols shall 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 shall 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 shall conform to AA 45, Architectural Class I or II, with a coating thickness 0.7 mil or thicker. Organic coatings shall 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 shall permit attachment of panel framing system. Provide cap for each post. Panel framing system shall consist of aluminum extrusions and interlocking track components designed to interlock with concealed fasteners. Panels shall be fabricated of rectangular extruded tubular aluminum with a minimum wall thickness of 0.125 inches. Panels shall be removable and interchangeable. Posts shall 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 shall 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 shall be constructed of 16 gauge cold-rolled steel door panel / front, and a 22 gauge cold-rolled steel tub. Cabinet shall 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 LAMINATE COVERED COUNTER TOPS

Fabricate with lumber and a core of exterior grade plywood (A-C Grade) or particleboard (ANSI A208.1, Grade 1-M-2 or better), glued and screwed to form an integral unit. Bond laminated plastic under pressure to exposed surfaces using manufacturer’s recommended glue.

a. Countertops shall be constructed to meet "Custom" quality grade as defined in AWI Quality Standards.
b. Finish shall meet NEMA LD 3, Grade PF 42 for plastic laminate.

C103008 1.2 ACRYLIC COUNTER TOPS

Provide 100% acrylic counter tops for use in non-residential construction.

Solid surfacing material shall consist of 100% pure acrylic polymer, mineral fillers, and pigments. The material shall be homogenous, not coated or laminated. Superficial damage to a depth of 0.010 inch (.254 mm) shall 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 shall be of the same construction and appearance, with solid ends and frame fronts, or with frames all around. Frames shall be not less than 3/4 inch by 1 1/2 inches (19 mm by 38 mm) hardwood. All ends, bottoms, backs, and partitions shall be hardwood plywood. Cabinet doors and drawer fronts shall be a minimum 3/4 inch (19 mm) of either plywood or medium density fiberboard cores with solid edge bands.

C103009 1.1.1 Quality Standards

Wall and base cabinets shall 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 shall 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.
b. Drawer slides shall 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.

C103010 CASEWORK

This paragraph includes all built-in premanufactured metal cabinetry for specialized functions such as labs, libraries, medical and dental facilities. At a minimum, all casework shall conform to the following chart:

Metals	Thickness and Material
Uprights (all)	

Horizontal foot	4" x 2" tube, 14 ga. (.075") HRPO Steel
Vertical upright	6" x 2" tube, 11 ga. (.118") HRPO Steel
Leveler	Threaded steel with plastic foot and rubber boot
Bridge Channels	
Channel (halves)	14 ga. (.075") CQCR Steel
Utility Rails	
Top and Bottom Channels	18 ga. (.047") CQCR Steel
Covers	18 ga. (.047") CQCR Steel
Dividers	16 ga. (.059") CQCR Steel
End Brackets	22 ga. (.030") CQCR Steel
Top Stretchers	
Channel	14 ga. (.075") CQCR Steel
End Brackets	18 ga. (.047") CQCR Steel
Vertical Utility Chase	
Chase Assembly	
Upper Chase Cover	
Cover	16 ga. (.059") CQCR Steel
Middle Chase Cover	
Cover	16 ga. (.059") CQCR Steel
Lower Chase Cover	
Cover	16 ga. (.059") CQCR Steel
Attachment Bracket	11 ga. (.118") CQCR Steel
Chase Cover	
Panel	18 ga. (.047") CQCR Steel
Bridge Cover Extension	
Panel	18 ga. (.047") CQCR Steel
Chase Cabinet Filler	
Panel	18 ga. (.047") CQCR Steel
Cantilever	

Cantilever	11 ga. (.118") HRPO Steel
End Panel	
Outer Cover	11 ga. (.118") HRPO Steel
Inner Cover	20 ga. (.036") CQCR Steel
Angle Bracket	16 ga. (.059") CQCR Steel
Shelves	
Shelf (all)	16 ga. (.059") CQCR Steel
End Panels (all)	14 ga. (.075") CQCR Steel
Reinforcement Channel (Flat and Seismic Flat Shelves)	16 ga. (.059") CQCR Steel
Seismic Shelf Support Lip	20 ga. (.036") CQCR Steel
Laminate Overhead Storage Cabinets	
Hanger bracket	14 ga. (.075") CQCR Steel
Solid door pull	Steel, aluminum or zinc
Glass door pull	Steel
Glass door track	Aluminum
Reinforcing hat channel for shelf	11 ga. (.118") HRPO Steel
Steel Overhead Storage Cabinets	
Sides, Back and Door	20 ga. (.036") CQCR Steel
Top, Bottom and Shelf	18 ga. (.047") CQCR Steel
Hanger bracket	14 ga. (.075") CQCR Steel
Solid door pull	Steel, aluminum or zinc
Glass door pull	Steel
Glass door track	Aluminum
Reinforcing hat channel for shelf	11 ga. (.118") HRPO Steel
Laminate Storage and Sink Cabinets	
Drawer glides	Steel rails with ball bearings
Door hinges	Steel
Door and Drawer pulls	Steel, aluminum or zinc

Leveler bracket	11 ga. (.118") HRPO Steel
Leveler	Threaded steel with plastic foot and rubber boot
Reinforcing hat channel for shelf	11 ga. (.118") HRPO Steel
Steel Storage and Sink Cabinets	
Sides, Back and Top	20 ga. (.036") CQCR Steel
Base, Bottom and Shelf	18 ga. (.047") CQCR Steel
Door (interior and exterior panels)	20 ga. (.036") CQCR Steel
Drawer glides	Steel rails with ball bearings
Door hinges	Steel
Door and Drawer pulls	Steel, aluminum or zinc
Leveler bracket	11 ga. (.118") HRPO Steel
Leveler	Threaded steel with plastic foot and rubber boot
Reinforcing hat channel for shelf	11 ga. (.118") HRPO Steel
Cord Reel	
Cord Reel	11 ga. (.118") HRPO Steel
Cable Storage Tray	
Tray	24 ga. (.024") CQCR Steel
Phenolic Drying Rack	
Mounting brackets, in-line	14 ga. (.075") CQCR Steel
Mounting brackets, end-of-bench	14 ga. (.075") CQCR Steel
Modular Power Block with GFCI Receptacle	
Housing and back bracket	16 ga. (.059") CQCR Steel
Modular Connector Faceplates	
Faceplate	16 ga. (.059") CQCR Steel
Non-Metals	Thickness and Material
Laminate Worksurfaces	
Worksurface core	1.12" X 45 lb/cu ft medium density particle board

Top and bottom laminate (standard)	.012" thick laminate
Front edge banding	3mm thick rigid plastic
Side and back edge banding	1mm thick, flat profile rigid plastic

ChemsurfÂ® Chemical-Resistant Laminate Worksurfaces

Worksurface core	1.12" X 45 lb/cu ft medium density particle board
ChemsurfÂ® (option)	VGP grade, resin-impregnated kraft paper
Front edge banding	3mm thick rigid plastic
Side and back edge banding	1mm thick, flat profile rigid plastic

Phenolic Resin Worksurfaces

Worksurface core	.75" thick, phenolic resin-impregnated kraft paper

Phenolic Drying Rack

Panel	1.00" thick, phenolic resin-impregnated kraft paper
Pegs	.38" dia x 5" long polypropylene pegs

Phenolic Drip Trough

Trough	1.00" thick, phenolic resin-impregnated kraft paper
Drain tube	.50" OD rigid phenolic tube
Drain flexible tube	.50" OD x 3' long flexible clear PVC tubing

Laminate Overhead Storage Cabinets

Panel core (Top, Bottom, Ends, Back, Door, Shelf)	.75" X 45 lb/cu ft industrial grade particle board
Laminate	.012" thick laminate
Cabinet edge banding	1mm thick, flat profile rigid plastic
Door edge banding	2mm thick, flat profile rigid plastic
Glass door	.25" thick tempered safety glass

Steel Overhead Storage Cabinets

Glass door	.25" thick tempered safety glass

Laminate Storage and Sink Cabinets

Panel core (Top, Bottom, Base, Ends, Back, Door, and Shelf)	.75" X 45 lb/cu ft industrial grade particle board
Laminate	.012" thick laminate
Cabinet edge banding	1mm thick, flat profile rigid plastic
Drawer/Door edge banding	2mm thick, flat profile rigid plastic
Drawer/Door stop	Rubber

Steel Storage and Sink Cabinets

Drawer/Door stop	Rubber

Power Block

Housing	Ultramid Nylon

Harness-to-Harness Connector

Housing	Ultramid Nylon

Duplex Receptacles

Housing	Ultramid Nylon

Modular Harnesses and Multipurpose Power Infeeds

Connector housing	Ultramid Nylon

Wire Manager

Channel	Rigid plastic

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 asbestos-free firestopping material capable of maintaining an

effective barrier against flame, gases and temperature. Provide non-combustible firestopping that is non-toxic to human beings during installation or during fire conditions. Devices and equipment for firestopping service shall be UL FRD listed or FM P7825 approved for use with applicable construction, and penetrating items.

C103012 1.1.1 Fire Hazard Classification

Material shall have a flame-spread of 25 or less, a smoke developed rating of 50 or less when tested in accordance with UL 723 or UL listed and accepted.

C103012 1.1.2 Firestopping Rating

Firestopping materials shall be UL FRD listed or FM P7825 approved for "F" and "T" ratings at least equal to the fire-rating of the fire wall in which penetrated openings are to be protected.

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 shall 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 shall not contain asbestos per 40 CFR 763.

C103013 1.1.2 Warranty

Contractor shall 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, per 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 per ASTM E 736.
d. Compressive Strength: 5.21 lb/sq. in. (35.9 kPa) as determined per ASTM E 761. Minimum thickness of sprayed fire-resistive material tested shall be 0.75 inch (19 mm) and minimum dry density shall be as specified, but not less than 15 lb/cubic foot (240 kg/cubic meter).
e. Corrosion Resistance: No evidence of corrosion per ASTM E 937.
f. Deflection: No cracking, spalling, or delaminating per ASTM E 759.
g. Effect of Impact on Bonding: No cracking, spalling, or delaminating per ASTM E 759.
h. Air Erosion: Maximum weight loss of 0.025 g/sq. foot (0.270 g/sq. meter) in 24 hours per ASTM E 859.
i. Fire-Test-Response Characteristics: Provide sprayed fire-resistive materials with the following surface-burning characteristics per 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 per ASTM G 21.

C103014 ENTRANCE FLOOR GRILLES AND MATS

Provide entrance mats at all entrances to the facility. Provide recessed entrance mats at building entrances with enclosed vestibule and or 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 he mat adjoins other floor materials. Mat system shall meet ASTM D-2047 coefficient of friction requirements for dry and wet surfaces. All portions of mat system shall comply with ASTM E 648, Class I for flammability and ASTM E 662 for smoke development of â‰¤ 450. Fasteners shall be non-corrosive screws and anchors for securing frames together to floors. Provide continuous vinyl bottom cushion to quiet clatter at recessed entrance mat systems. Hinges shall be flexible aluminum or thermoplastic hinge retained in aluminum tread port, and allow debris and moisture to flow through recessed mat. Provide ball and socket hinge for easy roll-up of recessed mat inserts for cleaning. Recessed entrance mat systems shall use either an aluminum or thermoplastic framework and shall have replaceable wearing surface inserts. Provide inserts as follows:

a. Carpet Inserts - Carpet insert fiber shall be colorfast, solution dyed, anti-static, anti-microbial, and waterproof. Fiber shall be 100% nylon or polypropylene. Each carpet fiber shall be bonded to rigid ply backing to prevent fraying and supplied in continuous splice-free lengths. Carpet shall be minimum of 30-oz./ydÂ².
b. Vinyl or Rubber Inserts - Vinyl or rubber inserts shall be removable and be made from recycled materials wherever possible. Inserts shall have serrated edges for scraping purposed or flexible abrasive grit tape, bonded to a rigid vinyl tread insert.

C103014 1.1 RECESSED MAT THERMOPLASTIC FRAME PROPERTIES

Thermoplastic frame shall be colorfast and UV-resistant. Tensile strength of frame shall comply with ASTM D 638. Tensile impact of frame shall comply with ASTM D 1822. Flexural strength of frame shall comply with ASTM D 790. Shore D hardness of frame shall comply with ASTM D 2240. Rockwell R hardness of frame shall comply with ASTM D 785. Coefficient of thermal expansion of frame shall comply with ASTM D 696.

C103014 1.2 RECESSED MAT ALUMINUM FRAME REQUIREMENTS

Aluminum frame and rail shall comply with ASTM B 221, alloy 6063-T5. Frame shall 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 1.3 SURFACE MOUNTED/LOOSE-LAY ENTRANCE MATS

Loose-lay mats shall have beveled vinyl or rubber transition edge and shall have surface of carpet or vinyl/rubber surfaces. Edges shall conform to ADA accessibility guideline 4.5.2, for loose-lay surface applications. Mats shall be easily removed yet remain adhered to floor to prevent mat from moving as pressure from walking is applied. Do not use carpet inserts unless directed otherwise.

C103014 1.4 SURFACE APPLIED ENTRANCEWAY FLOOR TILE

Applied entranceway floor tiles shall be in the form of carpet tiles, carpet tiles with vinyl or rubber scrubbing surfaces, or tiles of thermoplastic scrubbing surfaces only. Tiles shall be installed in areas where permanent mat is required but slab is not recessed to receive permanent recess mat. Tiles shall be securely installed without obvious seams, cleanable, dimensionally stable, and with maximum finished tile thickness of 1/2" above finished floor line. Carpet fibers shall 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 shall be PVC free and UV-resistant.

C103015 ORNAMENTAL METALWORK

Building components made from ornamental metals. Ornamental stair handrails are included in B1010 EXTERIOR STAIRS and PTS C20, *Stairs*.

C103090 OTHER INTERIOR SPECIALTIES

This paragraph covers other interior specialties not described by other assembly categories listed previously.

C103090 1.1 PROJECTION SCREEN

Motorized projection screen shall be wall, ceiling, or above ceiling mounting, and shall have a 120V motor that is lubricated for life, quick reversal type, has overload protector, integral gears, and preset accessible limit switches. Screen shall be flame retardant, mildew resistant and have black masked borders. Controls shall be wall mounted with wiring concealed within the wall construction. Pull-down projection screens shall be provided in lieu of motorized projection

screens as approved by the Activity, as specified in the project program.

C103090 1.2 OTHER INTERIOR SPECIALTIES

Also see PTS Sections C20 and C30 for additional interior specialties not specified here.

-- End of Section --

SECTION C20

STAIRS
4/08

C20 GENERAL

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 Construction Criteria Base (CCB) at the Whole Building Design Guide 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 03-100-10N, *Architecture*

UNIFIED FACILITIES GUIDE SPECIFICATIONS (UFGS)

C20 1.2 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Verification of satisfactory stair performance shall be 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 DOR shall comply with ACI 301. If concrete is found to be below the strength required in the tests, Contractor shall remove and replace that concrete and all associated building components at his own expense.

C20 1.3 DESIGN SUBMITTALS

Design Submittals shall be in accordance with Z10, *General Performance Technical Specifications*, UFGS section 01 33 10.05 20, *Design Submittal Procedures*, UFC 1-300-09N, *Design Procedures*and UFC 3-100-10N, *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) shall 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 shall 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 shall conform to NFPA 101. Provide steel guard and handrails.

C201001 1.1 STEEL STAIRS

Design shall conform to AISC S335 or AISC S342L.

C201001 1.1.1 Materials

a. Structural Carbon Steel - 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 shall 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 shall 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 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 shall comply to 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 shall 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.

C201001 1.5 WOOD STAIRS

Wood stairs may be used only for residential construction. Provide wood treads of minimum 1-1/4 inches thickness, of clear red or white oak. Risers shall be nominal one-inch finish lumber. Provide natural finish equivalent to one coat of sealer and two coats of varnish on all exposed surfaces.

C201002 FIRE ESCAPE STAIRS

Design fire escapes of the type and arrangement to conform to Fire Escape Stairs, of NFPA 101, Life Safety Code. Escape stairs shall be of steel or aluminum, conforming to the requirements of this specification section.

C201090 STAIR HANDRAILS, GUARDRAILS, AND ACCESSORIES

C201090 1.1 HANDRAILS

Design handrails in accordance with the IBC, except delete the handrail design load reduction code exceptions for residential, prisons, industrial, high hazard, and storage facilities. NAAMM PR, 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 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 shall 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 shall be coated with a high performance coating or anodized in accordance with AAMA 611, Class I.

C201090 1.1.3 Ornamental Handrails

Provide ornamental railings. Provide anchorage and fasteners as recommended by the product manufacturer. Railing system shall conform to ASTM E 985, minimum concentrated test load requirement.

C201090 1.1.4 Glass Handrails

Provide glass railings consisting of continuous 1/2-inch (13 mm) beveled tempered glass structural balusters with continuous railing cap and bottom shoe molding. Railing cap and shoe molding shall be 6063-T52 aluminum, type 304 stainless steel, brass, or bronze.

C201090 1.1.5 Wood Handrails

Wood handrails shall only be used for residential construction. Provide wood handrails of pre-finished natural hardwood. Wood shall be coated with hard acrylic finish to withstand indentations.

C201090 1.2 METAL LADDERS

C201090 1.2.1 Metal Ladders

Provide vertical ladders conforming to Section 7 of 29 CFR 1910.27.

C201090 1.2.2 Installation

Offset distance from the rungs to the finished wall surface not less than 7 inches (175 mm). Provide heavy clip angles riveted or bolted to the stringer and drilled for not less than two 1/2-inch (12 mm) diameter expansion bolts as indicated. Provide intermediate clip angles not over 48 inches (1200 mm) on center.

C201090 1.2.3 Ladder Cages

Where the height of the ladder is greater than 20 feet (6000 mm), provide a cage to conform to 29 CFR 1910.27.

a. Cage fabrication - Provide attachments for fastening bands to the side rails of ladders or directly to the structure.

-- End of Section --

SECTION C30

INTERIOR FINISHES
03/10

C30 GENERAL

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 Construction Criteria Base (CCB) at the Whole Building Design Guide 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)

C30 1.1.2 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01, *General Building Requirements*

UFC 3-100-10, *Architecture*

UFC 3-120-10, *Interior Design*

UNIFIED FACILITIES GUIDE SPECIFICATIONS (UFGS)

UFGS 09 62 50.10, *Thin Film Flooring System for Aircraft Maintenance Facilities*

C30 1.2 QUALITY ASSURANCE

C30 1.2.1 Paint Applicatorâ€™s Qualifications

C30 1.2.1.1 SSPC QP 1 Certification

For the application of industrial coatings identified in the Project Program, all contractors and subcontractors that perform surface preparation or coating application shall 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 shall remain certified while accomplishing any surface preparation or coating application. The painting contractors and painting subcontractors must remain so certified for the duration of the project. If a contractor's or

subcontractor's certification expires, the firm will not be allowed to perform any work until the certification is reissued. Requests for extension of time for any delay to the completion of the project due to an inactive certification will not be considered and liquidated damages will apply. Notify the Contracting Officer of any change in contractor certification status.

C30 1.2.2 Aircraft Maintenance Hangar Flooring Installer Qualifications

The Designer of Record shall utilize UFGS Specification Section 09 62 50.10, *Thin Film Flooring System for Aircraft Maintenance Facilities*, to provide the required installer qualifications for the floor coating system.

C30 1.3 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Verification of satisfactory interior finish assemblies' performance shall be via Performance Verification Testing, as detailed in this section of the RFP.

C30 1.3.1

Provide sample of textured ceiling application for DOR approval before resuming work. Sample shall be used as a reference for remaining application.

C30 1.3.2

Provide sample of multicolor paint application for DOR approval before resuming work. Sample shall be used as a reference for remaining application.

C30 1.3.3

Provide sample of terrazzo and/ or architectural cast-in-place concrete floor application for DOR approval before resuming work. Sample shall be used as a reference for remaining application.

C30 1.4 DESIGN SUBMITTALS

Design Submittals shall be in accordance with Z10, *General Performance Technical Specifications*, UFGS section 01 33 10.05 20, *Design Submittal Procedures*, UFC 1-300-09N, *Design Procedures*and UFC 3-100-10N, *Architecture*.

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 09 62 50.10, *Thin Film Flooring Systems for Aircraft Maintenance Facilities*

C30 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) shall 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 shall 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

Interior wall finishes shall be moisture and mildew resistant, 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 shall include, but are not limited to, abrasive blasted surfaces, colored surfaces, exposed aggregate, grooved surfaces, or tooled surfaces.

C301002 PLASTER WALL FINISHES

Veneer plaster shall be gypsum plaster veneer finish on gypsum base finishes, or cement plaster veneer finish on concrete or masonry. Refer to Section C3040 for paint system and gloss level.

C301002 1.1 GYPSUM PLASTER

Provide gypsum neat plaster or high strength gypsum plaster base coat conforming to ASTM C28. High strength gypsum plaster shall have a compressive strength of not less than 2,500 psi, when tested dry in accordance with ASTM C472.

C301002 1.1.1

High strength gypsum gaging plaster finish coat shall have a compressive strength of not less that 4,500 psi when tested dry in accordance with ASTM C472.

C301002 1.1.2

Provide gypsum molding plaster for ornamental plaster in accordance with ASTM C59.

C301002 1.1.3

Provide Keene's cement finish coat conforming to ASTM C61.

C301002 1.1.4

Provide acoustical gypsum plaster finish coat conforming to ASTM E1042 Type I or II Class A, noncombustible.

C301002 1.2 CEMENT PLASTER

C301002 1.2.1

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 1.2.2

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 1.2.3

Factory-mixed finish coat according to the manufacturer's instructions.

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 REGULAR GYPSUM BOARD

ASTM C36/C36M and ASTM C1396/C1396M 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, tapered edges.

C301003 1.2 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 1.3 CEMENTITIOUS BACKING UNITS

ANSI A108.11 and ANSI A118.9, 5/8 inch (15.9 mm) thick; 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 1.4 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 shall 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 1.5 JOINT TREATMENT

ASTM C475, Joint compound shall 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 1.6 FASTENERS

ASTM C514. Fasteners shall 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 1.7 ACCESSORIES

ASTM C1047. Fabricate from corrosion protected steel or plastic designed for intended use. Accessories manufactured with paper flanges are not acceptable. Flanges shall be free of dirt, grease, and other materials that may adversely affect bond of joint treatment. Provide prefinished or job decorated materials. For predecorated gypsum board provide prefinished metal or plastic trim to match predecorated gypsum board. Install as recommended by GA 214, GA 216 and GA 224.

C301003 1.8 LEVEL OF FINISH

C301003 1.8.1

Tape and finish gypsum board in accordance with ASTM C840, GA 214 and GA 216. Plenum areas above ceilings shall be finished to GA 214, Level 1. Water resistant gypsum backing board, ASTM C630/C630M, to receive ceramic tile shall be finished to GA 214, Level 2. Walls to receive a heavy-grade wall covering or have textured finish before painting shall be finished to GA 214 Level 3. Walls without wall wash lighting to receive paint (MPI Gloss Level 2), light textures, or wall coverings shall be finished to GA 214 Level 4. Unless otherwise specified, all gypsum board walls, partitions shall 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 1.8.2

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 1.8.3

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 PORCELAIN & CERAMIC TILE WALL SYSTEM FINISHES

Provide tile wall systems as defined in the Tile Council of America (TCA) handbook for porcelain and ceramic tile installations suitable for the service requirements listed. Install systems in accordance with ANSI A108/A118 series standards. Colored grout with sealer shall 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 shall 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 shall 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 shall 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.

C301005 WALL COVERINGS

Wall coverings shall be material designed specifically for the specified use. The wallcovering shall contain a non-mercury based anti-microbial. The wallcovering shall be the type made without the use of cadmium-based stabilizers. Wallcovering shall have a Class A flame spread rating of 0-25 and smoke development rating of 0-50 when tested in accordance with ASTM E84. The wall preparation, trimming, adhesive and application shall be according to the manufacturer’s printed directions. The manufacturer shall approve the installers in writing. The material must be easily cleaned by traditional methods such as washing, wiping, or vacuuming. Primer and adhesive shall be of a type recommended by the wallcovering manufacturer and shall contain a non-mercury based anti-microbial. Adhesive shall be strippable type. Do not apply wall coverings to the interior surface of exterior walls.

C301005 1.1 VINYL WALL COVERING

C301005 1.1.1

Vinyl wallcovering shall be a vinyl coated woven or nonwoven fabric with germicidal additives and shall conform to ASTM F793, Category V Type II, 13.1 to 22 ounces (371 g to 624 g) total weight per square yard and width of 54 inches (1370 mm). Provide ASTM F793, Category VI, Type III, 22 ounces (624 g) and above to cover rough textured walls such as masonry.

C301005 1.1.2

Provide a polyvinyl fluoride film, 0.0005 inch (0.012 mm) thick or thicker shall be factory applied to the wall covering where additional resistance to staining and soiling from exposure to staining reagents or chemicals and resistance from abuse is required. The film shall be transparent (clear), medium gloss.

C301005 1.2 FABRIC WALL COVERING

C301005 1.2.1

Fabric wallcovering shall be woven material of Polyester or Polyolefin, or a combination of the two fibers with an acrylic backing. The face shall be treated with a soil repellent finish. The material must be a minimum of 48 inches (1219 mm) wide. "Tackable" wall covering shall be "self-healing" from tack penetration through the covering into the substrate. The material must be a minimum of 12 ounces (340 g) per square yard exclusive of backing. A tackable wall covering will not be required for smoother, less textured surface appearance.

C301005 1.2.2

Acoustical wallcovering shall be textured, woven or non-woven material of polyester or polyolefin, or a combination of the two fibers with an acrylic backing. The material must be a minimum of 48 inches (1219 mm) wide and a minimum of 16 ounces (454 g) per square yard. The material shall have an NRC rating of .15 on gypsum board in accordance with ASTM C423.

C301005 1.3 WALLCOVERING BORDER

Vinyl wallcovering border shall be a vinyl coated woven or nonwoven fabric with germicidal additives and shall conform to ASTM F793, Type I, 7 to 13 ounces (198 g to 368 g) or Type II, 13.1 to 22 ounces (371 g to 624 g) total weight per square yard.

C301005 1.4 SURFACE PREPARATION FOR UNEVEN WALLS

C301005 1.4.1

Wall liner shall be a non-woven polyester cellulose blend having a minimum weight of 3.7 ounces (105 g) per square yard and a total minimum thickness of 0.013 inches (0.33 mm). Wall liner shall have a Class A flame spread rating of 0-25 and smoke development rating of 0-50 when tested in accordance with ASTM E84. Use for masonry walls or walls with uneven surfaces.

C301005 1.4.2

For masonry or rough textured walls, use a veneer plaster finish

to smooth the walls prior to wallcovering installation.

C301005 1.5 CORNER GUARDS

C301005 1.5.1

Corner guards shall be 3/32 inch (2.4 mm) thick and shall cover 1 inch (25 mm) each side of corner at right angles. Corner guards shall be clear polycarbonate. Use in executive areas, office areas, and wall-covered areas subject to cart traffic as a minimum.

C301005 1.6 WAINSCOT CAP

C301005 1.6.1

Wainscot cap shall be satin-finished extruded aluminum approximately 3/4 inch (19 mm) high, feathered at bottom edge, with an approximate 3/16 inch (5 mm) exposed face on top edge, and grooved to receive the covering. Adhesive to install wainscot cap shall be of a type recommended by the manufacturer of the cap.

C301005 1.6.2

Wood wainscot cap shall be 3-1/2 by 3/4 inch (89 mm by 19 mm) solid hardwood, AWI Custom grade, with painted or stained finish. Profile shall be a molded shape.

C301006 ACOUSTICAL PANELS ADHERED TO WALLS

Acoustical wall treatment shall be acoustical panels, sound absorbing wall units, or acoustical wall systems. Acoustical panel system shall include manufacturer's standard concealed fasteners, splines, tracks, and other components necessary to complete the installation. Fire rating for the complete composite system shall be Class A, 200 or less smoke density and flame spread less than 25, when tested in accordance with ASTM E84.

C301006 1.1 ACOUSTICAL FABRIC COVERED WALL PANELS

C301006 1.1.1

Prefinished factory assembled wall panels shall consist of, seamless fabric covered fiberglass or mineral fiber core system. Perimeter edges shall be reinforced by an aluminum frame or a formulated resin edge hardener. Fabric covering shall be stretched free of wrinkles and then bonded to the edges and back or bonded directly to the panel face, edges, and back of panel a minimum distance standard with the manufacturer. Mounting shall be by manufacturer's standard concealed spline, mechanical fasteners, magnetic fasteners, hook and loop or adhesive mounting.

C301006 1.1.2

Stretched fabric wall panel system shall consist of continuous perimeter and butt seam mounting extrusions, site-fabricated and applied directly to the substrate. Facing fabric shall be stretched over core materials and attached without adhesives, nails, tacks, screws or tapes so that fabric may be removed and replaced with framework in place.

C301006 1.1.3

Fabric shall be seamless, 100% polyester or olefin or a blend of the two. Light fastness (fadeometer) shall be approximately 40 hours in accordance with AATCC 16.

C301006 1.1.3.1

Non-woven, embossed texture, or needle punched 100 percent polyester, minimum 12 ounces (340 g) per linear yard. Tear strength shall be minimum 25 pounds (11.25 kg) machine direction and minimum 40 pounds (18 kg) cross-machine direction in accordance with ASTM D1117. Tensile strength shall be minimum 50 pounds (22.5 kg) machine direction and minimum 75 pounds (34 kg) cross-machine direction in accordance with ASTM D5034.

C301006 1.1.3.2

Woven, minimum 2-ply 100 percent polyester or olefin, minimum 12 ounces (340 g) per linear yard. Tear strength shall be minimum 29 pounds (13 kg). Tensile strength shall be 150 pounds (68 kg) minimum in accordance with ASTM D5034.

C301006 1.1.3.3

Perforated vinyl covering with fabric backing, minimum 20 ounces (567 g) per linear yard total weight.

C301006 1.2 ACOUSTICAL WALL PANELS

Aspen wood fibers bonded together with an inorganic hydraulic cement binder, formed in a continuous process under heat and pressure. Nominal overall panel thickness shall be 1 inch (25 mm). Noise Reduction Coefficient shall be not less than NRC 0.85 for Type C-40 and C-80 mounting.

C301090 OTHER WALL FINISHES

C301090 1.1 SOLID SURFACING WALL FINISHES

Solid surfacing material shall consist of 100% pure acrylic polymer, mineral fillers, and pigments. The material shall 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) shall 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 shall extend from top of shower pan to a minimum of 84 inches (2130 mm) or to underside of ceiling and shall surround the shower enclosure. Wall finish shall extend from top of tub to 84 inches (2130 mm) and shall surround tub shower. If used in a kitchen, solid surfacing wall finish shall 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.

C301090 1.2 PLASTIC LAMINATE WALL FINISHES

Plastic laminate used for wall applications shall be commercial grade, high-pressure laminate with a #60 finish, approved for vertical applications. NEMA LD 3.

C301090 1.2.1

The kitchen wall area between the counter top backsplash and the bottom of the wall cabinet shall be plastic laminate. Laminate wall finish shall include factory recommended fasteners/adhesives/caulk to complete the installation.

C301090 1.3 DECORATIVE PANELING SYSTEM

Architectural paneling system applied to interior walls shall include associated furring, fastening, and trim to complete the installation. Wood paneling system finish shall be factory or field applied.

C301090 1.4 WOOD TRIM AND DETAILING FINISHES

Decorative panels, chair rail, standing and running trim, shall be of AWI custom grade hardwood with a painted or stained finish. Refer to C3040 "INTERIOR PAINTING AND SPECIAL FINISHES" for finish system. Chair rail shall be a minimum of 3-1/2 inches (89 mm) high. Profile of chair rail shall be a molded shape. Wood trim shall include associated furring, fastening, adhesives and trim to complete the installation.

C301090 1.5 IMPACT RESISTANT PANEL OR WAINSCOT WALL FINISHES

The wall covering panel system, or wainscot, shall be an impact-resistant acrylic PVC sheet of a minimum 0.060 inch (1.5 mm) thickness in 4 foot by 8 foot (1219 mm by 2438 mm) sheets. The system shall be Class A (ASTM E84), UL listed, and chemical and stain resistant. It shall include all accessories, such as top caps, joint covers, and inside and outside corners, necessary for a complete installation. A full range of colors and textures shall be included. The wall panel system shall have coordinating color and pattern options for all components within the system. The wall panel system shall offer a 21 ounce (595 g) fabric backed vinyl wallcovering laminated to a 0.020 inch (.51 mm) rigid acrylic/PVC backing capped with 1 mil of protective film.

C301090 1.6 CORNER AND WALL GUARDS

Corner and wall guards shall be high-impact formed stainless steel minimum of 16 gauge with concealed mounting hardware and end closure with 2” wing size. If used with an impact resistant panels system, the guards shall be from the same manufacturer as the impact resistant wall panel system, chair or hand rail system and shall include all accessories necessary for a complete installation. A full range of finishes and textures shall be included.

C301090 1.7 HIGH IMPACT THERMOPLASTIC WALL SURFACES

Thermoplastic wall surfaces used for wall applications shall be commercial grade, approved for vertical applications. NEMA LD 3. 4’X8’ wall panels with ½” overlap feature for seamless application. 1/32” thickness with approx 3/16” finished texture

C3020 FLOOR FINISHES

Refer to C3040 "INTERIOR PAINTING AND SPECIAL FINISHES" for painted floor coatings.

C302001 TILE FLOOR FINISHES

Provide tile floor systems as defined in the Tile Council of America (TCA) 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 shall be a minimum of two grade above base grade.

Mortar shall 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 shall 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 shall have a minimum Coefficient of Friction (wet and dry) of 0.6, ASTM C1028. Tile shall 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, 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 shall 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 shall have less than a 0.5 percent water absorption rate, ASTM C373. Use in toilets, showers and shower drying rooms and locker rooms.

C302001 1.3 PORCELAIN FLOOR TILE

Porcelain floor tiles shall 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 shall have a minimum breaking strength of 300 pounds (202 kg), ASTM C648 and a maximum absorption rate of 0.5%, ASTM C373. Use in lobbies, corridors, toilets, kitchens, dining facilities, and other areas with minimal maintenance requirements, high resistance to staining, absorption and high durability requirements. Tile shall be color through, impervious, unglazed or glazed finish with an unpolished, semi-polished, polished, or textured surface.

C302001 1.4 QUARRY FLOOR TILE

Quarry floor tiles shall be a minimum of 1/2 inch (12.7 mm) thick tiles with a maximum of 1/4 inch (6 mm) grout width. Tile shall have a minimum breaking strength of 350 pounds (158 kg), ASTM C648 and a maximum absorption rate of 3%, ASTM C373. Use in lobbies, corridors, kitchens, dining facilities, and other areas with high durability requirements. Use grout release for darker pigmented grout colors. Tile shall have a maximum of 3.0 percent water absorption rate when tested in accordance with ASTM C373. Non-slip, abrasive grain or textured surface required for tile in areas where there is excessive water or grease and oils. Tile shall consist of semi-vitreous, vitreous or clay material with smooth or textured surface and unglazed finish.

C302002 TERRAZZO FLOOR FINISHES

Refer to Project Program for special design requirements.

C302002 1.1 BONDED TERRAZZO

Provide terrazzo, bonded to concrete, consisting of a terrazzo topping over an underbed. Use in all general areas requiring terrazzo. Where structural movement is anticipated which may injure the terrazzo, use the sand cushion (floating) method. Provide cementitious terrazzo in accordance with the NTMA bonded terrazzo specification.

C302002 1.2 RESINOUS TERRAZZO

Resinous terrazzo flooring shall be an epoxy terrazzo system that conforms to the requirements specified in the NTMA resinous epoxy specification.

C302003 WOOD FLOORING

C302003 1.1 WOOD FLOORING SYSTEM

Wood strip flooring shall be 3/4 inch (19 mm) thick by 2-1/4 inches (57 mm) face width, kiln dried, continuous tongue and groove and of standard lengths. Beech and birch shall be second grade in accordance with NOFMA Grading Rules. Hard maple shall be second and better in accordance with MFMA-01. Red and white oak shall be select grade in accordance with NOFMA Grading Rules. Strip flooring shall be marked with the trademark of the grading agency. The strip flooring shall be NOFMA certified and installed in accordance with NOFMA publication *Installing Hardwood Flooring*. Nails shall be as recommended by strip flooring manufacturer's recommendations. Resilient pads shall be pneumatic rubber, PVC, or polyurethane resilient mounts to fit the floor system. Moisture barrier shall be 6 mil minimum thickness polyethylene.

C302003 1.1.1

Rooms where wood flooring is to be installed shall have permanent heating and air conditioning installed and working or adequate arrangements for ventilation and temperature controls starting not less than 3 days prior to beginning the installation of flooring and continuing throughout the remainder of the contract period.

C302003 1.1.2

Concrete slab shall be level, steel troweled to a tolerance of 1/8 inch (3 mm) plus or minus in a 10 foot (3048mm) radius. Slab surface shall be clean, dry, and approved by wood floor manufacturer prior to start of installation.

C302003 1.1.3

Unless otherwise approved, flooring shall be laid parallel to the length of the area to be floored. Strips shall be laid with close joints, snugly driven up but providing for expansion in accordance with humidity conditions expected during the life of the flooring. End joints shall be so alternated that there will be at least two boards between end joints in the same plane and at least 6 inches between end joints in adjacent boards. Space for expansion shall be left along perimeter walls and around fixed projections through the floor surface.

C302003 1.1.4

Flooring shall be sanded to a smooth, even, uniform finish without burns in accordance with the flooring manufacturer’s recommendations. The flooring shall be left clean and ready to receive the finishing materials. Refer to C3040 "INTERIOR PAINTING AND SPECIAL FINISHES" for floor finishes.

C302004 RESILIENT FLOOR FINISHES

All resilient flooring shall meet or exceed applicable ADA horizontal requirements. Each type of flooring shall be installed with recommended adhesive in accordance with the manufacturers' written instructions. Installers shall be approved by the manufacturer in writing and shall have a minimum of 3 yrs experience for each type of flooring to be installed. A minimum of 2% total quantity for each type flooring, color and pattern shall be provided and stored 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 SHEET FLOORING SYSTEMS

C302004 1.1.1

Resilient linoleum sheet flooring shall be made with natural raw materials including linseed oil, flour, and rosin or resin binders double calendared onto natural jute backing, ASTM F2034, Type I. Pattern and color shall extend throughout thickness of material. Gage shall be 0.10 inch (2.5 mm). Static load limit shall be 250 psi per ASTM F970. Seal linoleum using manufacturer's recommended sealer for commercial application. The manufacturer's technical representative shall review and approve each typical sample application on-site prior to resuming the installation and shall spot check each 1,196 square yards (1000 square meters) for quality control. Work shall not commence on any portion of work until the manufacturer's technical representative renders approval on site. A manufacturer's five year warranty is required.

C302004 1.1.2

Resilient rubber sheet flooring shall be commercial quality, dimensionally stable, wear resistant, firm and slip resistant with integral color. The rubber sheet flooring shall be a three-layer construction consisting of a rubber wear layer, a cushioned layer, and a polyester backing. All components of the construction shall be thoroughly vulcanized to prevent delamination. The rubber sheet flooring shall conform to ASTM F1860-98 and require no wax maintenance.

C302004 1.1.3

Resilient homogeneous vinyl sheet flooring shall be commercial quality, 0.080 inch (2.0 mm) overall nominal gauge with a minimum wear layer thickness of 0.066 inch (1.6 mm) and a minimum of 6 feet (1.83 m) wide. It shall be non-layered, non-backed and include a protective urethane finish for ease of maintenance and conform to ASTM F1303, Type II Grade 1 Class A. Seams shall be recess scribed and heat welded with patterned or solid color weld rods depending on the contractor’s design intent to camouflage, blend or accent the seam lines. Resilient homogeneous vinyl sheet flooring shall require no wax maintenance.

C302004 1.1.4

Resilient heterogeneous vinyl sheet flooring shall be commercial quality, 0.080 inch (2.0 mm) overall nominal gauge with a minimum wear layer thickness of 0.066 inch (1.6 mm) and a minimum of 6 feet (1.83 m) or 12 feet (3.6 m) wide. It shall include a protective urethane finish for ease of maintenance and conform to ASTM F1303, Type I Grade 1 Class A. Seams shall be recess scribed and heat welded with patterned or solid color weld rods depending on the contractor's design intent to camouflage, blend or accent the seam lines. Resilient heterogeneous vinyl sheet flooring shall require no wax maintenance.

C302004 1.2 RESILIENT TILE FLOORING SYSTEM

C302004 1.2.1

Resilient vinyl composition tile (VCT) shall 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 shall be manufactured in accordance with Federal Specification SS-T-312B (1), Type IV, Comp. 1, Class 2, through pattern. Tile shall be finished in accordance with manufacturer’s written instructions.

C302004 1.2.2

Resilient static dissipative vinyl composition tile (SDT) shall be of 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; with an antistatic additive. The SDT tile shall conform to ASTM F1066, Class 2 through pattern. The flooring shall be installed with recommended adhesive and accessories; and finished in accordance with the manufacturer's written instructions. Use SDT floors in computer areas or areas with sensitive electronic where the Project Program requires tile.

C302004 1.2.3

Resilient vinyl tile shall be 0.1 inch (2.5 mm) thick, with a vinyl wear layer of 0.035 inches (.9 mm) and shall be planks or square tiles. It shall 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 tile that are easily cleaned with off-the-shelf products. Surface finishes requiring manufacturer supplied or special order cleaning solutions are not acceptable. Vinyl tile flooring shall have a marble, granite, stone, terrazzo or wood pattern. A manufacturer's 10-year warranty is required.

C302004 1.2.4

Resilient rubber tile shall be 100% synthetic rubber with color through, slip resistance formulation, with a minimum base thickness of 0.125 inch (3.2 mm) and a minimum stud height of 0.024 inch (0.6 mm). Rubber tile shall conform to ASTM F1344, Class I and ASTM E648, Class 1. The product shall require no wax maintenance. A manufacturer's 10-year warranty is required for a raised round or square surface profile. A manufacturer's 5-year warranty is required for other surface textures with slip resistant formulation.

C302004 1.2.5

Resilient athletic rubber tile shall be 100% synthetic heavy rubber or recycled crumb rubber tile, 3/8 inch (9 mm) thick. Rubber tile shall conform to ASTM F1344 for recycled crumb rubber tile. The product shall require no wax maintenance. A manufacturer’s 2-year warranty is required. Use rubber tile flooring in weight and exercise rooms.

C302004 1.2.6

Resilient linoleum tile shall 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 shall extend throughout thickness of material. Gage shall be 0.10 inch (2.5 mm). Static load limit shall be 250 psi per ASTM F970. Seal linoleum using manufacturer's recommended sealer for commercial application. The manufacturer's technical representative shall review and approve each typical sample application on-site prior to resuming the installation and shall spot check each 1,196 square yards (1000 square meters) for quality control. Work shall 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) shall be approved by the manufacturer in writing. Carpet manufacturer shall be established and in good standing with the industry. A minimum of 5% total quantity for each color and pattern shall be provided and stored within the building for future replacement patching.

C302005 1.2 CARPET CONSTRUCTION

Provide carpet types based on Table I, "Carpet Construction Type by Facility."

TABLE I - CARPET CONSTRUCTION TYPE BY FACILITY

Facility Type	Tufted Cut Pile	Tufted Loop Pile	Tufted Cut and Loop	Tufted Tip Shear	Tufted Frieze	Woven Loop or Cut & Loop	Carpet Tile
Administrative	-	X	X	X	X	X	X
Open Plan Offices	-	X	X	X	-	X	X

Private Offices	X	X	X	X	X	X	X
Corridors	-	X	X	X	-	X	X
Conference Rooms	X	X	X	X	X	X	X
Child Care Centers	-	X	-	-	-	-	X
Family Housing	X	X	-	-	-	-	-
Bachelor Officer's Quarters	X	X	X	-	-	X	-
Bachelor Enlisted Quarters	-	X	-	-	-	X	X
Lodging Facilities	X	X	X	X	X	X	X
Training/Educational	-	X	X	-	-	X	X
Borders and insets	X	X	X	X	X	X	X

C302005 1.3 CARPET SEVERE WEAR SPECIFICATIONS

Provide carpet that complies with Table II, "Carpet Specifications for Severe Wear Classification."

TABLE II - CARPET SPECIFICATIONS FOR SEVERE WEAR CLASSIFICATION

Carpet Construction	Pile Fiber	Weight oz/SY (kg/m2) min. x.037	Pile Height in.(mm) min.	Gauge min.	Pile Density oz/cuyd (kg/m3) min.
Tufted Cut Pile	CF NYLON	32(1.18)	.175(4.45)	1/10	6600 (270)
Tufted Loop Pile	CF NYLON	26(0.82)	.120(3.05)	1/10	6600 (270)
Tufted Cut and Loop	CF NYLON	28(1.04)	.135(3.43)	1/10	7400 (303)
Tufted Tip Shear	CF NYLON	28(1.04)	.135(3.43)	1/10	7400 (303)
Tufted Frieze	CF NYLON	32(1.18)	.175(4.45)	1/10	6600 (270)
Woven Loop	CF NYLON	26(1.04)	.135(3.43)	1/8	7400 (303)
Woven Cut and Loop	CF NYLON	26(1.04)	.135(3.43)	1/8	7400 (303)

C302005 1.4 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 died and solution-dyed, Type 6 or Type 6.6 continuous hollow filament nylon

C302005 1.5 CARPET BACKING REQUIREMENTS

a. Provide manufacturer's standard high performance carpet backing.
b. Moisture resistant carpet backing shall pass the 24 hour British Spill Test.
c. Moisture proof carpet backing shall 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 1.6 CARPET PERFORMANCE CHARACTERISTICS

a. Flammability: Carpet shall meet the Critical Radiant Flux Classification of not less than 0.45 W/sq. cm. when tested in accordance with ASTM E648. Carpet shall generate less than 450 rating when tested in accordance with ASTM E662
b. Static Control: Carpet shall 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 shall be permanently dimensionally stable with no delamination of components or any edge raveling or zippering.
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. Sustainability; Provide carpets with recycled fiber content, and renewable material content in the attached cushion or backing materials certified by an independent testing agency.
h. Written Warranty: Lifetime commercial warranty for texture retention and edge raveling, zippering, delamination is required. Seam preparation and adhesives shall be recommended by the carpet manufacturer in accordance with the warranty.
i. Appearance Retention: Provide carpet with a multi-color pattern for excellent appearance retention and soil hiding characteristics.
j. Indoor Air Quality: Provide carpets that meet the criteria of the CRI "Green Label" Indoor Air Quality Testing Program. Carpet adhesive VOC's shall be less than 50 g/L.

C302005 1.7 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

C302006 MASONRY AND STONE FLOORING

C302006 1.1 UNIT MASONRY FLOORING SYSTEM

Unit masonry flooring system and coordinating base shall be fired red clay brick, or chemical resistant brick unit masonry flooring. Provide unit masonry flooring systems in accordance with the Brick Industry Association recommendations and the Tile Council of America *Handbook for Ceramic Tile Installation*.

C302006 1.2 STONE FLOOR AND BASE FINISHES

C302006 1.2.1

Natural Stone Flooring and coordinating base shall be of marble, granite, or travertine.

C302006 1.2.2

Aggregate Stone Tile and coordinating base shall be a composite of marble or granite.

C302006 1.2.3

Install stone floor and base in accordance with the recommendations of the Marble Institute of America, the Indiana Limestone Institute of America, Inc. the National Building Granite Quarries Association, Inc. in addition to the Tile Council of America *Handbook for Ceramic Tile Installation*as applicable to the type of stone being installed.

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 or vinyl straight base at carpet installations, rubber or vinyl 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 shall be 4 inch (100 mm) high and 1/8 inch (3.2 mm) thick as required unless indicated otherwise. The wall base shall include inside and outside corners and shall conform to ASTM F1861-98, Type TS. Provide wall base in rolls and not 4 foot lengths.

C302007 1.1.2

Flash-coved integral resilient sheet wall bases shall be installed in accordance with the manufacturers' printed instructions to include a cove stick having a minimum radius of 3/4 inch (19 mm) and finished with an approved cap strip.

C302007 1.2 CARPET WALL BASE FINISHES

Carpet wall base finishes shall consist of a strip of carpet matching or contrasting adjacent carpet, 4 inch (100 mm) high, with the top edge finished with an aluminum or vinyl edge profile; or an edge binding material matching the carpet.

C302007 1.3 WOOD BASE FINISHES

Wall base shall be a minimum of 3-1/2 inches (90 mm) high and AWI custom grade hardwood molding with mitered inside and outside corners. Refer to C302008 - 1.1.2 for wood finishes.

C302007 1.4 STONE AND MARBLE BASE FINISHES

Stone and marble wall base shall coordinate with the adjacent flooring and shall be 4 inch (89 mm) and 3/4 inch (19 mm) thick.

C302007 1.5 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.

C302008 1.2 PORCELAIN AND STONE STAIR TREADS, RISERS AND LANDINGS

Refer to C302001 and C302006 for porcelain and stone stair finishes. Provide treads with textured surfaces or raised patterns and visually impaired nosing inserts as required.

C302008 1.3 CARPETED STAIR TREADS, RISERS AND LANDINGS

Refer to C302005 for carpeted stair finishes. Provide dense padding on treads and nosings for increased appearance retention and durability.

C302009 FLOOR TOPPINGS AND TRAFFIC MEMBRANES

Assemblies include floor toppings and membrane systems.

C302009 1.1 REFLECTIVE, CHEMICAL AND SLIP RESISTANT FLOOR SYSTEMS

C302009 1.1.1 Thin Film Floor Coating

The Designer of Record shall utilize UFGS Specification Section 09

62 50.10, *Thin Film Flooring System for Aircraft Maintenance Facilities*, for the project specification submittal and for test patch, surface preparation, and installation requirements. Use MPI Product #212 "Thin Film Flooring System for Aircraft Maintenance Facilities" for product specifications.

C302009 1.1.2 Dry Shake Floor Topping

System shall be a nonferrous, non-oxidizing metallic aggregate, dry-shake surface hardener system consisting of specially processed cementitious binder, plasticizer, and water-reducing admixtures, formulated and processed under the stringent quality control of the manufacturer. The hardener shall be proportioned and sealed in standard moisture resistant bags. The manufacturer shall guarantee their aggregate to be free of rust, corrosive materials, oil, petroleum, or other water-base materials when delivered. The manufacturer shall replace any material found to contain any such materials, or any other material, which is deemed unsatisfactory. The manufacturer shall provide a full-time technical representative, qualified in designing and adjusting concrete mixes, to assist in the application of the aggregate surface hardener system. A mono molecular surface evaporation retardant film, as recommended by ACI 305R and ACI 308R, shall be provided for use under drying conditions, due to high concrete or ambient temperatures, low humidity, high winds, and so forth. This includes heated interiors during cold weather, to aid in maintaining concrete moisture during the early placement stages of the plastic concrete. Retarder shall be certified by its manufacturer to be compatible with the surface hardener and shall be used in accordance with the manufacturer's recommendations. Curing and sealing materials and procedures shall be as recommended by the manufacturer of the aggregate surface hardener system and ASTM C309 or ASTM C1315. All installation shall be in accordance with manufacturer’s instructions. Coordinate the concrete mix design with the dry shake floor topping manufacturer to optimize bond of floor finish to slab. Spread topping mix with a mechanical spreader.

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 shall receive a minimum of two coats of hardener-sealer curing agent for dust protection. These hardener-sealer-cured floors shall be finished with a curing agent that shall penetrate the concrete to permanently seal the floor against moisture and the penetration of contaminants. The curing agent shall be non-toxic, non-flammable, and non-combustible and shall be installed in accordance with the manufacturer’s printed instructions. The finished floor shall be dust-free.

C302010 1.2 COLORED CONCRETE FLOORS

Colored concrete floors shall include a colored pigment either applied as a topical dye; or a concrete topping with integral color pigment; or a dry shake pigment application, as required by the project program. Concrete floor shall be trowel applied in a pattern, or shall include grit for slip resistance.

C302011 RAISED ACCESS FLOORING

C302011 1.1 FLOORING SUPPORT SYSTEM

Design support system to allow for 360 degree clearance in laying out cable and cutouts for service to machines and so that panel and stringer together take up maximum of 2 inches (50 mm).

C302011 1.1.1 Pedestals, Shafts, and Caps

Provide pedestals of steel or aluminum, each capable of carrying 4,960 pounds (2250 kg) axial load without permanent deformation. Provide permanent factory applied corrosion resistant finish for pedestals made of ferrous materials. Provide base plate not less than 4 inch by 4 inch by 1/8 inches (100 mm by 100 mm by 3 mm) thick, welded to shaft of pedestal. Approved die-formed bases of equivalent load spreading capacity and bearing area may be provided in lieu of flat base plates. Provide shafts to support design loads. Provide Pedestal Caps designed to fit precisely over pedestal shafts and to interlock with panels and stringers to prevent tilting, rocking, or vibrating of panels when live load is applied. Provide pedestals with adjusting threads or other devices that will permit leveling of floor system with adjustment range of approximately 2 inches (50 mm). Provide lock nuts, set screws, or other locking devices to positively lock final pedestal vertical adjustments in place, independent of floor panels. Do not use self-tapping screws, snap type connections, or spring-action lock-nuts. All adhesives used shall be as recommended by the manufacturer.

C302011 1.1.2 Stringers

Fabricate from rolled or formed galvanized steel conforming to ASTM A591/A592M. Incorporate interlocking pedestal and stringers in pedestal stringer system, providing positive seating of panels to prevent tilting, rocking, or vibrating of panels when live load is applied. Provide stringers that can be added or removed after floor is in place. Fasten end of each stringer and mid-point of each four foot stringer positively to pedestal heads, using manufacturer's standard screws. Provide screws that are removable from top.

C302011 1.2 FLOOR PANELS

Provide interchangeable 24 inch by 24 inch (610 mm by 610 mm) square module panels capable of supporting design loads. Panels shall be of weight that can readily be removed and handled by one person using lifting tool furnished by access floor manufacturer. Panel finish surface to be Grade HW 120 high pressure plastic laminate conforming to NEMA LD. Use either factory attached carpet tile, factory attached - static dissipative grounded carpet tile or field installed carpet tile with seams overlapping the access floor grid panels or to transition areas where only part of the space is recessed for access floor.

a. Aluminum Panels - ASTM B85, SC84A, die-cast or extruded construction for rooms with MRI equipment.

b. Steel Panels - Die-formed construction. Weld flat steel top sheet to one or more formed steel stiffener sheets. Provide zinc-coating conforming to ASTM A591/A591M, Class C, with manufacturer's standard corrosive resistant electrically conductive epoxy paint finish . Wood, plastic and other combustible products are prohibited.

c. Cementitious or Concrete Filled Formed Steel Panels Entirely non-combustible steel shell and cementitious or concrete fill, corrosive resistant inside and out. Seal cut edges in accordance with manufacturer's recommendations.

d. All panels to be manufactured in USA and individually labeled "Made in USA"

C302011 1.2.1 Gravity Held Factory Finished Panels with Bolted Stringer Understructure

Fasten end of each stringer and mid-point of each four foot stringer positively to pedestal heads, using manufacturer's standard screws. Provide corner lock system for all general office (bare for carpet tile) applications with screws that are removable from top.

C302011 1.3 GROUNDING

Ground access floor system for safety hazard and static suppression. Connection of access floor support system to building grounding electrodes is specified in another section of this RFP. Provide positive contact between components for safe, continuous electrical grounding of entire floor system. Total system resistance from wearing surface of floor to building grounding electrode shall be within the range of 0.5 megohms to 20,000 megohms for computer rooms, electronics offices, data centers and control rooms, 0.2 megohms to 2.0 megohms for clean rooms and laboratories.

C302011 1.4 THRESHOLD(S)

Provide interior thresholds of nonferrous materials where flooring materials or floor levels change.

C302011 1.5 RAMPS

Provide ramps of required slip resistance and slope conforming to ATBCB ADA Title III.

C3030 CEILING FINISHES

Refer to C3040 "INTERIOR PAINTING AND SPECIAL COATINGS" for painted ceiling finishes.

C303001 ACOUSTICAL CEILING TILES AND PANELS

C303001 1.1 ACOUSTICAL CEILING PANELS

All acoustical ceiling panels shall be 24 inch by 24 inch (610 mm by 610 mm), with a minimum light reflectance of .75 (except as noted), Class A, flame spread 25 or less and smoke development of 50 or less, ASTM E84. All acoustical ceiling panels shall have minimum 60% recycled content except as noted. Acoustical ceiling panels shall conform to ASTM E1264. Provide square edge except as noted.

C303001 1.1.1

For typical open office areas, conference rooms, executive offices, provide non-asbestos mineral composition acoustical ceiling panels of Type III with factory-applied standard washable painted finish or Type IV with factory-applied plastic membrane-faced vinyl, Form: 1, 2, or 3. Provide reveal edge in lobbies,

conference rooms and command suites; otherwise, provide square edge in all other locations to receive acoustical panels.

C303001 1.1.2

For typical humid areas such as toilets, kitchens, fitness and locker rooms, provide non-asbestos mineral or glass composition acoustical ceiling panels bonded with ceramic, moisture resistant thermo-setting resin, or other moisture resistant material with factory-applied standard washable painted finish; and recycled content: minimum of 40%.

C303001 1.1.3

For areas with very high humidity, heavy soiling, staining, impact abrasion, or limited security concerns, such as bachelor's quarters, laundry rooms, or maintenance shops, provide Type V, Steel or Type VII, aluminum faces with white baked on enamel finish, and non-asbestos mineral composition absorbent backing.

C303001 1.1.4

For areas requiring a concealed grid system, provide non-asbestos mineral composition acoustical ceiling panels of Type III with factory-applied standard washable painted finish or Type IV with factory-applied plastic membrane-faced vinyl, Form: 1, 2, or 3; Size: 12 inch by 12 inch by 5/8 inch (305 mm by 305 mm by 19 mm), Edge: for concealed grid installation.

C303001 1.1.5

Provide NRC and CAC ratings as follows:

Type of space	Minimum NRC	Minimum CAC
Open Office Areas	.75	40-44
Conference Rooms, Classrooms	.60	35-39
Activity spaces, Lobbies, Corridors	.60	35-39
Executive offices	.60	35-39
Toilets	.50	35-39
Kitchens	.50	35-39
Fitness/Locker Rms	.50	35-39
All other spaces	.50	35-39

Base the tested NRC value on Mounting Type E-400 of ASTM E795.

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 uplighted 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, 1/2 or 5/8 inch (12.7 mm or 15.9 mm) thick, tapered edges. Use for ceilings in humid areas. Do not use as a substrate in tiled areas where tile will be exposed to direct moisture contact or condensation accumulation. Support moisture resistant gypsum board at 12 inches (305 mm) on center. Provide 1/2 inch (12.7 mm) for single-family residential projects only. 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 IMPACT RESISTANT GYPSUM BOARD

Reinforced gypsum panel with imbedded fiber mesh or polycarbonate resin thermoplastic backing, 5/8 inch (15.9mm) thick, tapered edges, in accordance with Structural Failure Test; ASTM E695 or ASTM D2394 and Indentation Test; ASTM D5420 or ASTM D1037. For use whenever gypsum board partitions are allowed for barracks, training facilities, and industrial facilities. Provide metal framing of 20-gauge minimum. Provide fasteners that meet manufacturer requirements and specifications. Impact resistant gypsum board shall 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 veneer plaster.

C303002 1.5 TEXTURED CEILING FINISH SYSTEM

Applied textured ceiling finish shall be plaster based. Refer to paragraph "C301002 - 1.1 GYPSUM PLASTER" for finish requirements.

C303002 1.6 JOINT TREATMENT

ASTM C475, Joint compound shall 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 1.7 FASTENERS

ASTM C514, Fasteners shall 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 1.8 ACCESSORIES

ASTM C1047, Fabricate from corrosion protected steel or plastic designed for intended use. Accessories manufactured with paper flanges are not acceptable. Flanges shall 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 1.9 LEVEL OF FINISH

C303002 1.9.1

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 shall be finished to GA 214, Level 3. Ceilings without critical lighting to receive flat paints, light textures, or wall coverings shall be finished to GA 214, Level 4. Unless otherwise specified, all gypsum board walls, partitions and ceilings shall 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 1.9.2

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 shall 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 shall have a compressive strength of not less than 2,500 psi, when tested dry in accordance with ASTM C472.

C303004 WOOD CEILINGS

Not Used.

C303005 SUSPENSION SYSTEMS

C303005 1.1 EXPOSED SUSPENDED ACOUSTICAL CEILING GRID

Provide 24 inch by 24 inch (610 mm by 610 mm) aluminum or steel non-corroding intermediate-duty standard grid system for lay-in acoustical panels (ASTM C635). Finish shall be factory applied white baked enamel. Provide manufacturer's hold down clips for fire rated assemblies and wall or edge molding. Hang grid system as recommended by manufacturer but with no less than 0.106 inch (2.7 mm) diameter wires (ASTM A641A, A641M, Class 1), or with one by 3/16 inch (4.76 mm) galvanized steel straps conforming to ASTM A653A, A653M (for light commercial zinc coating) or ASTM A366A, A366M (with an electrodeposited zinc coating, Type RS). Use ASTM A580/A580M, composition 302 or 304, condition annealed stainless steel, 0.106 inches (2.7 mm) in diameter over high humidity areas such as commercial kitchens and pools. Install suspended grid system with acoustical sealant (ASTM C843, nonstaining and ASTM C636). Recycled content shall be a minimum of 25%.

C303005 1.2 CONCEALED SUSPENDED ACOUSTICAL CEILING GRID

Provide 12 inch by 12 inch (305 mm by 305 mm) aluminum or steel non-corroding intermediate-duty concealed grid system for lay-in acoustical panels (ASTM C635). Finish shall be factory applied white baked enamel. Provide manufacturer’s wall or edge molding. Hang grid system as recommended by manufacturer but no less than with 0.106 inch (2.7 mm) diameter wires (ASTM A641A, A641M, Class 1), or with one by 3/16 inch (4.76mm) galvanized steel straps conforming to ASTM A653A, A653M (for light commercial zinc coating) or ASTM A366A, A366M (with an electrodeposited zinc coating, Type RS). Install suspended grid system with acoustical sealant (ASTM C843, nonstaining) and in accordance with ASTM C636. Recycled content shall be a minimum of 25%.

C303005 1.3 SUSPENDED AND FURRED CEILING SYSTEMS

ASTM C841 (for lath); ASTM C645 (for GWB).

Provide steel materials for metal support systems with galvanized coating per ASTM A653/A653M, G60; aluminum coating ASTM A463/A463M, T1-25; or a 55% aluminum-zinc coating. Provide suspended ceiling framing in accordance with ASTM C754, except framing members shall be 16 inches (400mm) unless otherwise noted.

C303006 METAL STRIP CEILINGS

Not Used.

C303090 OTHER CEILING AND CEILING FINISHES

C3040 INTERIOR COATINGS AND SPECIAL FINISHES

The following coatings are applied directly to all surfaces of interior construction.

C304001 GENERAL REQUIREMENTS

All paint shall 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.

Paints and coatings shall comply with Master Painters Institute Green Performance Standard GPS-1-08 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 LEED VOC Budgeting to analyze the total impact of all flat, non-flat and special purpose coatings on the project.

MPI PAINT SYSTEMS IDENTIFIED IN THE RFP TAKE PRECEDENCE OVER OTHER MPI SYSTEMS. IF THE RFP DOES NOT IDENTIFY A PAINT SYSTEM APPLICABLE TO ALL PAINTING OF THE FACILITY, UTILIZE THE MPI ARCHITECTURAL PAINTING, INTERIOR SYSTEM MANUAL TO IDENTIFY APPROPRIATE PAINT SYSTEMS. UTILIZE THE "PREMIUM GRADE" SYSTEMS AND COMPLY WITH ALL LIMITATIONS STATED IN THE MPI "APPROVED PRODUCTS LIST" FOR EACH SYSTEM. PRODUCTS HAVING AN MPI EPR 3 RATING SHALL BE GIVEN PREFERENTIAL CONSIDERATION OVER LOWER EPR RATINGS. THE HIGHER PERFORMING SYSTEMS SHALL BE USED UNLESS THE LOWER PERFORMING SYSTEMS CAN BE JUSTIFIED BASED ON LIFE CYCLE COSTS TO INCLUDE SURFACE PREPARATION, APPLICATION, DISPOSAL, ENVIRONMENTAL IMPACT, AND RECOATING CYCLES BASED ON EXPOSURE REQUIREMENTS. ONLY USE PAINT PRODUCTS THAT HAVE BEEN TESTED FOR THE MPI'S "DETAILED PERFORMANCE". DO NOT USE PRODUCTS THAT HAVE BEEN TESTED ONLY FOR "INTENDED USE".

C304001 1.1 MPI GLOSS LEVELS

Gloss levels shall 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. Use G2 "Velvet-like" Flat for ceilings, residential walls away from human contact and low traffic areas. 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. Use G5 Semigloss for ceilings, walls, doors and trim for high durability and clean ability when a surface is expected to have human contact and is routinely touched. Use G6 Gloss only in special situations such as for piping identification or special effects. The MPI Gloss and Sheen Standard values are measured per ASTM D523, method D 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.

d. DFT – The short-term designation for dry film thickness. DFT is the minimum acceptable depth or thickness of a coating or system in the dry state. The maximum acceptable DFT is not more than 50% greater than the minimum acceptable DFT (example... DFT = 2 mils, maximum DFT = 3 mils). The DFT indicated in the paint systems below relate to new coatings - MPI INT. MPI RIN will be less than the indicated DFT.

e. Paint System Abbreviations: BF - Block Filler; C – Clear coat; P – Primer coat; I – Intermediate coat; T – Topcoat.

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" or "shall" 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.

C304002 CONCRETE FINISHES

C304002 1.1

New and uncoated existing, and Existing, previously painted, Concrete surfaces:

a. High Performance Architectural Latex, System DFT: 4 mils

1) MPI INT 3.1C-G2/RIN 3.1J-G2 (Flat); P: MPI 3, I: MPI 138, T: MPI 138

2) MPI INT 3.1C-G3/RIN 3.1J-G3 (Eggshell-like); P: MPI 3, I: MPI 139, T: MPI 139

3) MPI INT 3.1C-G5/RIN 3.1J-G5 (Semigloss); P: MPI 3, I: MPI 141, T: MPI 141

b. Institutional Low Odor / Low VOC Latex, System DFT: 4 mils

1) MPI INT 3.1M-G3/RIN 3.1L-G3 (Eggshell-like); P: MPI 3, I: MPI 145, T: MPI 145

2) MPI INT 3.1M-G5/RIN 3.1L-G5 (Semigloss); P: MPI 3, I: MPI 147, T: MPI 147

C304002 1.2

New and uncoated existing and Existing, previously painted Concrete surfaces in toilets, food-preparation, food-serving, restrooms, laundry areas, shower areas, areas requiring a high degree of sanitation, and other high humidity areas unless otherwise specified, (Fill all holes in masonry surface):

a. Waterborne Light Industrial Coating, Not for human or abrasive contact areas, System DFT: 4.8 mils

1) MPI INT 3.1L-G5/RIN 3.1C-G5 (Semigloss); P: MPI 153, I: MPI 153, T: MPI 153

b. Alkyd, System DFT: 4.5 mils

1) MPI INT/RIN 3.1D-G5 (Semigloss); P: MPI 3, I: MPI 47, T: MPI 47

c. Epoxy, System DFT: 4 mils

1) MPI INT 3.1F-G6/RIN 3.1E-G6 (Gloss); P: MPI 77, I: MPI 77, T: MPI 77

C304002 1.3

New and uncoated existing and Existing, previously painted concrete floors:

a. Latex Floor Paint, MPI INT/RIN 3.2A-G2 (Flat); System DFT: 5 mils, P: MPI 60, I: MPI 60, T: MPI 60

b. Epoxy, MPI INT/RIN 3.2M-G6 (Gloss), System DFT: 5 mils, P: MPI 77, I: MPI 77, T: MPI 77

C304003 CONCRETE MASONRY FINISHES

C304003 1.1

New and uncoated Existing Concrete masonry:

a. High Performance Architectural Latex, System DFT: 11 mils

1) MPI INT 4.2D-G2 (Flat); BF: MPI 4, P: N/A, I: MPI 138, T: MPI 138

2) MPI INT 4.2D-G3 (Eggshell-like); BF: MPI 4, P: N/A, I: MPI 139, T: MPI 139

3) MPI INT 4.2D-G5 (Semigloss); BF: MPI 4, P: N/A, I: MPI 141, T: MPI 141

b. Institutional Low Odor / Low VOC Latex, System DFT: 4 mils

1) MPI INT 4.2E-G3 (Eggshell-like); BF: MPI 4, P: N/A, I: MPI 145, T: MPI 145

2) MPI INT 4.2E-G5 (Semigloss); BF: MPI 4, P: N/A, I: MPI 147, T: MPI 147

c. Multi-color, MPI INT 4.2H, BF: MPI 4, P: MPI 125, I: MPI 112, T: MPI 112, C: MPI 121

C304003 1.2

Existing, previously painted Concrete masonry:

a. High Performance Architectural Latex, System DFT: 4.5 mils

1) MPI RIN 4.2K-G2 (Flat); P: MPI 50, I: MPI 138, T: MPI 138

2) MPI RIN 4.2K-G3 (Eggshell-like); P: MPI 50, I: MPI 139, T: MPI 139

3) MPI RIN 4.2K-G5 (Semigloss); P: MPI 50, I: MPI 141, T: MPI 141

b. Institutional Low Odor / Low VOC Latex, System DFT: 4 mils

1) MPI RIN 4.2L-G3 (Eggshell-like); P: MPI 50, I: MPI 145, T: MPI 145

2) MPI RIN 4.2L-G5 (Semigloss); P: MPI 50, I: MPI 147, T: MPI 147

c. Multi-color, MPI INT 4.2E; BF: MPI 4, P: MPI 125, I: MPI 112, T: MPI 112, C: MPI 121

C304003 1.3

New and uncoated Existing Concrete masonry units in toilets, food-preparation, food-serving, restrooms, laundry areas, shower areas, areas requiring a high degree of sanitation, and other high humidity areas unless otherwise specified, (Patch imperfections and fill all masonry surface voids with block filler):

1. Waterborne Light Industrial Coating, Not human or abrasive contact areas, System DFT: 11 mils

   1) MPI INT 4.2K-G5 (Semigloss); BF: MPI 4, P: N/A, I: MPI 153, T: MPI 153

2. Alkyd, System DFT: 12 mils

   1) MPI INT 4.2N-G5 (Semigloss); BF: MPI 4, P: MPI 50, I: MPI 47, T: MPI 47

3. Epoxy, System DFT: 10 mils

   1) MPI INT 4.2G-G6 (Gloss); BF: MPI 116, P: N/A, I: MPI 77, T: MPI 77

C304003 1.4

Existing, previously painted, concrete masonry units in toilets, food-preparation, food-serving, restrooms, laundry areas, shower areas, areas requiring a high degree of sanitation, and other high humidity areas unless otherwise specified (Patch imperfections and fill all masonry surface voids with block filler):

a. Waterborne Light Industrial Coating, Not for human or abrasive contact areas, System DFT: 4.5 mils

   1) MPI RIN 4.2G-G5 (Semigloss); P: MPI 50, I: MPI 153, T: MPI 153

b. Alkyd, System DFT: 4.5 mils

   1) MPI RIN 4.2C-G5 (Semigloss); P: MPI 50, I: MPI 47, T: MPI 47

c. Epoxy, System DFT: 5 mils;

   1) MPI RIN 4.2D-G6 (Gloss); P: MPI 77, I: MPI 77, T: MPI 77

C304004 METAL FINISHES

C304004 1.1

New and Existing, previously painted steel/ferrous surfaces not otherwise specified:

a. High Performance Architectural Latex, System DFT: 5 mils

   1) MPI INT 5.1R-G3 (Eggshell-like); P: MPI 79, I: MPI 139, T: MPI 139

   2) MPI INT5.1R-G5 (Semigloss); P: MPI 79, I: MPI 141, T: MPI 141

2. Alkyd, System DFT: 5.25 mils

1) MPI INT 5.1E-G3 (Eggshell-like); P: MPI 79, I: MPI 51, T: MPI 51

2) MPI INT 5.1E-G5 (Semigloss); P: MPI 79, I: MPI 47, T: MPI 47

C304004 1.2

New and Existing, previously painted steel/ferrous surfaces in toilet, food preparation, food serving, restrooms, shower areas and areas requiring a high degree of sanitation and other high humidity areas not otherwise specified except floors, hot metal surfaces, and new prefinished equipment:

a. Alkyd, System DFT: 5.25 mils

1) MPI INT 5.1E-G5 (Semigloss); P: MPI 79, I: MPI 47, T: MPI 47

C304004 1.3

New and Existing, previously painted miscellaneous non-ferrous surfaces not otherwise specified:

a. High Performance Architectural Latex, System DFT: 5 mils. MPI INT 5.4F-G5 (Semigloss); P: MPI 95, I: MPI 141, T: MPI 141
b. Alkyd, System DFT: 5 mils. MPI INT 5.4J-G5 (Semigloss); P: MPI 95, I: MPI 47, T: MPI 47

C304004 1.4

New and Existing, previously painted miscellaneous galvanized doors not otherwise specified:

a. Epoxy, System, MPI INT 5.3D-G6 (Gloss); P: MPI 101, I: MPI 77, T: MPI 77
b. Alkyd, System DFT: 5 mils. MPI INT 5.3C-G5 (Semigloss); P: MPI 26, I: MPI 47, T: MPI 47

C304005 INTERIOR WOOD FINISHES

C304005 1.1

New and Existing, uncoated wood and plywood not otherwise specified:

a. High Performance Architectural Latex, System DFT: 4.5 mils

1) MPI INT 6.4S-G4 (Satin-like); P: MPI 39, I: MPI 140, T: MPI 140

2) MPI INT 6.4S-G5 (Semigloss); P: MPI 39, I: MPI 141, T: MPI 141
b. Alkyd, System DFT: 4.5 mils, MPI INT 6.4B-G5 (Semigloss); P: MPI 45, I: MPI 47, T: MPI 47
c. Institutional Low Odor / Low VOC Latex, System DFT: 4 mils

1) MPI INT 6.4T-G4 (Satin-like); P: MPI 39, I: MPI 146, T: MPI 146

2) MPI INT 6.4T-G5 (Semigloss); P: MPI 39, I: MPI 147, T: MPI 147

C304005 1.2

Existing, previously painted wood and plywood not otherwise specified:

a. High Performance Architectural Latex, System DFT: 4.5 mils

1) MPI RIN 6.4B-G4 (Satin-like); P: MPI 46, I: MPI 140, T: MPI 140

2) MPI RIN 6.4B-G5 (Semigloss); P: MPI 46, I: MPI 141, T: MPI 141

b. Alkyd, System DFT: 4.5 mils, MPI RIN 6.4C-G5 (Semigloss); P: MPI 46, I: MPI 47, T: MPI 47

c. Institutional Low Odor / Low VOC Latex, System DFT: 4 mils

1) MPI RIN 6.4D -G4 (Satin-like); P: MPI 39, I: MPI 146, T: MPI 146

2) MPI RIN 6.4D-G5 (Semigloss); P: MPI 39, I: MPI 147, T: MPI 147

C304005 1.3

New and Existing, previously finished or stained wood and plywood, except floors; natural finish or stained:

a. Natural finish, oil-modified urethane, System DFT: 4 mils, MPI INT 6.4J-G4/RIN 6.4L-G4 (Satin-like); P: MPI 57, I: MPI 57, T: MPI 57

b. Stained, oil-modified urethane, System DFT: 4 mils, MPI INT 6.4E-G4/RIN 6.4G-G4 (Satin-like); P: MPI 90, I: MPI 57, T: MPI 57

C304005 1.4

New and Existing, previously finished or stained wood floors; natural finish or stained:

a. Natural finish, oil-modified urethane, System DFT: 4 mils, MPI INT/RIN 6.5C-G6 (Gloss); P: MPI 56, I: MPI 56, T: MPI 56

b. Stained, oil-modified urethane, System DFT: 4 mils, MPI INT/RIN 6.5B-G6 (Gloss); P: MPI 90, I: MPI 56, T: MPI 56

C304005 1.5

New and Existing, uncoated wood surfaces in toilets, food-preparation, food-serving, restrooms, laundry areas, shower areas, areas requiring a high degree of sanitation, and other high humidity areas not otherwise specified:

a. Waterborne Light Industrial Coating, System DFT: 4.5 mils, MPI INT 6.3P-G5 (Semigloss); P: MPI 45, I: MPI 153, T: MPI 153

b. Alkyd, System DFT: 4.5 mils, MPI INT 6.3B-G5 (Semigloss); P: MPI 45, I: MPI 47, T: MPI 47

C304005 1.6

Existing, previously painted wood surfaces in toilets, food-preparation, food-serving, restrooms, laundry areas, shower areas, areas requiring a high degree of sanitation, and other high humidity areas not otherwise specified:

a. Waterborne Light Industrial Coating, (Not for human or abrasive contact areas) System DFT: 4.5 mils, MPI INT 6.3P-G5 (Semigloss); P: MPI 46, I: MPI 153, T: MPI 153

b. Alkyd, System DFT: 4.5 mils, MPI INT 6.3B-G5 (Semigloss); P: MPI 46, I: MPI 47, T: MPI 47

C304005 1.7

New and existing uncoated wood doors:

a. Alkyd, System DFT: 4.5 mils,

1) MPI INT 6.3B-G5 (Semigloss); P: MPI 45, I: MPI 47, T: MPI 47

C304006 GYPSUM WALL BOARD FINISHES

C304006 1.1

New and Existing, previously painted Gypsum Wallboard not otherwise specified (interior gypsum finish of exterior wall):

a. High Performance Architectural Latex, System DFT: 4 mils

1) MPI INT/RIN 9.2B-G2 (Flat); P: MPI 50, I: MPI 138, T: MPI 138

2) MPI INT/RIN 9.2B-G3 (Eggshell-like); P: MPI 50, I: MPI 139, T: MPI 139

3) MPI INT/RIN 9.2B-G5 (Semigloss); P: MPI 50, I: MPI 141, T: MPI 141

b. Institutional Low Odor / Low VOC Latex, System DFT: 4 mils

1) MPI INT/RIN 9.2M-G3 (Eggshell-like); P: MPI 50, I: MPI 145, T: MPI 145

2) MPI INT/RIN 9.2M-G4 (Satin-like); P: MPI 50, I: MPI 146, T: MPI 146

3) MPI INT/RIN 9.2M-G5 (Semigloss); P: MPI 50, I: MPI 147, T: MPI 147

c. Multi-color, MPI INT9.2G; P: MPI 125, I: MPI 112, T: MPI 112, Clear Coat: MPI 121

C304006 1.2

New and Existing, previously painted Gypsum Wallboard in toilets, food-preparation, food-serving, restrooms, laundry areas, shower areas, areas requiring a high degree of sanitation, and other high humidity areas not otherwise specified:

a. Waterborne Light Industrial Coating, (Not for human or abrasive contact areas) System DFT: 4 mils, MPI INT/RIN 9.2L-G5 (Semigloss); P: MPI 50, I: MPI 153, T: MPI 153

b. Alkyd, Use for metal or trim for a durable, hard finish. System DFT: 4 mils, MPI INT/RIN 9.2C-G5 (Semigloss); P: MPI 50, I: MPI 47, T: MPI 47

c. Epoxy, Use for high humidity areas requiring easy to clean enamel finishes. System DFT: 4 mils, MPI INT 9.2E-G6 (Gloss) / MPI RIN 9.2D-G6 (Gloss)P: MPI 50, I: MPI 77, T: MPI 77

C304007 SPECIAL COATINGS TO WALLS

C304007 1.1 HIGH PERFORMANCE ARCHITECTURAL COATING (HIPAC)

HIPAC shall be a durable, organic system applied to a continuous (seamless) high-build film and cure to a hard glaze finish. They shall be resistant to continuous heat and humidity, abrasion, staining, chemicals, and biological growth. Coating shall be installed as a complete system, and as recommended by the manufacturer and have a flame

spread index of not more than 25 and a smoke developed index of not more than 50 when tested in accordance with ASTM E84.

C304007 1.1.1

Two-component, epoxy-polyamide shall be chemical and corrosion-resistant, adhesive, alkali-resistant, and water-tolerant for metal, wood, concrete, masonry surfaces, and painted surfaces where high gloss or glaze type finish, extreme workability and resistance to abrasion and stains is required. Minimum dry film thickness is 3 mils for each of two coats. Furnish Gloss or Semigloss finish. Maximum volatile organic compounds (VOC) shall be 340 grams/liter.

C304007 1.1.2

Single Component, Moisture-Curing Urethane shall be a flexible, abrasion- and impact-resistant, use for floors, walls, machinery, equipment and other surfaces where good abrasion resistance, color retention, gloss retention, graffiti resistance and good resistance to acids, alkalis, solvents, strong cleaners and sanitizers, fuel and chemicals are necessary. Can also be used on concrete floors, brick and masonry surfaces (properly conditioned), metals (properly primed), and wood (properly prepared and sealed.) Minimum dry film thickness is 3 mils for each of 3 coats. Use Type I, Aliphatic, for exterior use except for oily or resinous exterior wood surfaces. Use Type II, Aromatic, for interior use.

C304007 1.2 IMPACT RESISTANT WALL FINISHES

Provide textured acrylic architectural coating system: a seamless textured acrylic water-based coating system, having a thickness of at least 20 mils, on surfaces scheduled to receive it. System shall be composed of pure acrylic polymers, silica dioxide, ethylene dioxide and pigments. System shall have a Barcoll Hardness Index of 35.0 or greater, a flame spread of 8.5 or less as determined by ASTM E84, smoke contribution of 7.0 or less, and have water vapor permeability of 27.5 English Perms or greater when tested in accordance with ASTM E96. (MPI 42)

Finish may only be installed by factory-qualified applicators in accordance with the manufacturer's printed instructions and recommendations, to fulfill warranty requirements. All coating system components shall be products of the same manufacturer. A minimum of one sample wall application shall be provided. Upon approval of the sample wall by the project manager, the application shall serve as a standard for the remaining work. The manufacturer's certified representative shall provide an on-site training demonstration of the application and care of the finish for the end-user's facility manager or other representative.

-- End of Section --

SECTION D20

PLUMBING
3/10

D20 GENERAL

D20 1.1 NARRATIVE

This section 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 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 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 3-400-10N, *Mechanical Engineering*

UFC 3-420-01, *Design: Plumbing Systems*

D20 1.3 DESIGN SUBMITTALS

Design Submittals shall be in accordance with Z10, *General Performance Technical Specifications*, UFGS section 01 33 10.05 20, *Design Submittal Procedures*, UFC 1-300-09N, *Design Procedures*and UFC 3-400-10N, *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) shall approve the following construction submittals as a minimum:

Fixtures, equipment, and OMSI information for all equipment and fixtures.

D2010 PLUMBING FIXTURES

Plumbing fixtures shall be provided in accordance with the IBC, IPC, and as specified.

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 electronic flush control is specified in the ESR Section D20. Electronic flush control shall conform to UL 1951 and ASSE 1037. Flush valve shall not exceed 1.28 GPF (4.8 LPF). Handicapped fixture mounting height and appurtenances shall be in accordance with UFAS and ADAAG.

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 electronic flush control is specified in the ESR Section D20. Electronic flush control shall conform to UL 1951 and ASSE 1037. Dual function flush valve shall 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 shall not exceed 1.28 GPF (4.8 LPF). Handicapped fixture mounting height and appurtenances shall be in accordance with UFAS and ADAAG.

D201001 1.3 FLUSH TANK WATER CLOSETS

ASME A112.19.2, white vitreous china, siphon jet. Provide ASME A112.19.5 trim. Water flushing volume of the water closet shall not exceed 1.28 GPF (4.8 LPF). Handicapped fixture mounting height and appurtenances shall be in accordance with UFAS and ADAAG.

D201001 1.4 DUAL FUNCTION FLUSH TANK WATER CLOSETS

ASME A112.19.2, white vitereous china, siphon jet. Provide ASME A112.19.5 trim. Dual function flush tank water closet shall provide a dual flush that allows a 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 per flush shall not exceed 1.28 GPF (4.8 LPF). Handicapped fixture mounting height and appurtenances shall be in accordance with UFAS and ADAAG.

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. 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. Urinals shall have a discharge rate not exceeding 0.25 GPF. Provide ASME A112.19.5 trim and ASME 112.6.1M concealed chair carriers. Provide self-closing metering type flush valve, unless electronic flush control is specified in the ESR Section D20. Electronic flush control shall conform to UL 1951 and ASSE 1037.Handicapped fixture mounting height and appurtenances shall be in accordance with UFAS and ADAAG.

D201002 1.2 NON WATER USE 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 shall 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. Installation and testing shall be in accordance with the manufacturers' recommendations. Drain lines that connect to the urinal outlet shall not be made of copper tube or pipe. Urinal design and installation shall be ADA compliant. Slope the sanitary sewer branch line for non-water use urinals a minimum of 1/4-inch per foot. Manufacturer shall provide an 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 shall be white, ASME A112.19.2 vitreous china lavatories with minimum dimensions of 20 inches (508 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 electronic control is specified in ESR section D20. 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 20 inches wide by 18 inches (508 mm wide by 457 mm) front to rear. Provide ASME 112.18.1 copper alloy centerset faucets unless self closing metering or electronic control is specified in ESR section D20. 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 shall be in accordance with UFAS and ADAAG.

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 18 inches (457 mm) front to rear with 9 inch (230 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) shall be made of marble chips cast in white Portland cement to a compressive strength of not less than 3625 PSI (25 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 Z124.1.2, 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. Bathtub and shower supply fittings shall be diverter type with body mounted from behind the wall. Provide tub fill over-rim spout with diverter.

D201005 1.2 SHOWER FLOORS

Precast terrazzo or Acrylic Shower Floors: Terrazzo shall be made of marble chips cast in white Portland cement to produce a compressive strength of not less than 3625 psi (25 MPa) 7 days after casting. Provide brass body drains with nickel bronze strainers cast integral with terrazzo.

D201005 1.3 BATHTUBS

ASME A112.19.1 white enameled cast-iron or porcelain steel bathtubs, recessed type, minimum dimensions of 56 inches (1424 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. Bathtub and shower supply fittings shall be diverter type with body mounted from behind the wall. Provide tub over fill rim spout with diverter.

D201005 1.4 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. Anchor the mixing valves and the pipe to each showerhead in wall to prevent movement.

D201005 1.5 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 shall be constructed of white enameled cast iron with bubbler and push button control. Handicapped fixture mounting height and appurtenances shall be in accordance with UFAS and ADAAG.

D201006 1.2 ELECTRIC WATER COOLERS

AHRI 1010, wall-mounted, bubbler style, air-cooled condensing unit, 4.0 gph (4.20 mL 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. Handicapped fixture mounting height and appurtenances shall be in accordance with UFAS and ADAAG.

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.

Where indicated in ESR section D20, 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 either solder fittings, or press-on copper fittings. For buried piping, use type K tubing with either solder fittings, or press-on copper fittings.

D202001 1.2 CHLORINATED POLYVINYL CHLORIDE (CPVC)

When specified in ESR section D20, provide CPVC pipe, fittings, and solvent cement per 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 as required in the IPC.

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

Furnish proof that each make, model/design, and size of backflow preventer being furnished for the project is approved by and has a current "Certificate of Approval" from the Foundation for Cross-Connection Control and Hydraulic Research (FCCCHR)-USC. Listing of the particular make, model/design, and size in the current FCCCHR-USC will be acceptable as the required proof. Provide freeze protection for aboveground exterior applications in areas where the winter design temperature is at or below freezing.

D202003 1.2 WATER HEATERS

D202003 1.2.1 Electric Water Heaters

Electric water heaters with double heating element per UL 174 for water heaters with less than 120 gallons of storage and 200,000 btuh input. Provide water heater per UL 1453 for commercial water

heaters with 120 gallons of storage or more and 200,000 btuh input or more. Water heaters shall be 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 110 and 160 degrees F (43 and 71 degrees C). Water heater warranty shall be a minimum of 5 years.

D202003 1.2.2 Gas-Fired Water Heaters

High efficiency storage type water heaters per 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 per 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 shall meet AGA requirements. Water heaters shall be 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 shall be a minimum of 5years. Provide vent in accordance with NFPA 54.

D202003 1.2.3 Oil-Fired Water Heaters

UL 732 oil-fired water heaters with glass-lined steel tanks, high efficiency type, insulated with polyurethane foam insulation, replaceable anodes, with adjustable range thermostat to allow hot water settings between 110 and 160 degrees F (43 and 71 degrees C). Provide vent in accordance with NFPA 58.

D202003 1.2.4 Instantaneous Water Heater (Electric)

UL 499, heater(s) shall be of the modulating, under the sink, point-of-use type. Output temperature shall be adjustable from 40 degrees F to 160 degrees F. Heating elements shall be field replaceable. Unit(s) shall have a 10-year warranty.

D202003 1.2.5 Steam Heat Exchangers

D202003 1.2.6 Storage Tanks

AWWA D100, glass-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. Each building shall be provided

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 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

AWWA C701 turbine type, with register reading in liters and U.S. gallons.

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 (ASTM C 552, Type II, and Type III) or polyisocyanurate insulation (ASTM C 591, type I).

D202004 1.2 PIPING & EQUIPMENT IDENTIFICATION

In addition to the requirements in Section Z10, *General Performance Technical Specification*, provide laminated plastic 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 shall be per 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 in accordance with the IPC.

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 per the IPC.

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 per ASTM D 2665 or ASTM D 2661 may be provided. Plastic piping shall be equipped with approved firestopping devices as required by code.

D203001 1.2 CLEANOUTS

Provide cleanouts as required by the IPC. Material shall be consistent with the piping system materials.

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 per ASTM D 2665 or ASTM D 2661. PVC piping shall be equipped 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

Floor drains shall be flush strainer or extended rim type as required by the IPC. Provide in mechanical rooms, restrooms, fire pump room, laundry room, and plumbing chase areas. Provide floor sinks in kitchens. Provide floor sinks where required for interior air handling unit condensate drains.

D203004 SANITARY & VENT EQUIPMENT

D203004 1.1 PUMPS

D203004 1.1.1 Submersible 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. Duplex types

shall be provided 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 per ASTM D 2665 or ASTM D 2661 may be used. PVC piping shall be equipped with approved firestopping devices as required by code. Size and install piping in accordance with the IPC.

D204002 ROOF DRAINS

Roof drains shall conform to ASME A112.6.4, with dome and integral flange, and shall have 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 shall consist of a heavy cast-iron housing, brass or bronze sleeve.

D204004 INSULATION & IDENTIFICATION

Mineral fiber insulation on all drainage piping that may be subject to condensation. Provide a vapor retarder.

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 shall 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 shall be silicon-iron composition. Provide cleanouts and drains as specified for DWV piping, except material shall be silicon-iron composition.

D209003 INTERCEPTORS

D209003 1.1 OIL/WATER SEPARATOR

Oil/water separator, where required, in accordance with the IPC and with a minimum flow capacity to meet system demand.

D209003 1.2 GREASE INTERCEPTORS

Provide in accordance with the IPC and 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 shall be factory packaged as a unit. Receiver tank shall be per ASME PBVC Sec. VIII D1, labeled and rated for 125 PSI (862 kPa) gage, equipped with required valves and trimmings, including gage and automatic drain valve and ASME BPVC pressure safety relief valve. Air compressor and receiver shall be sized 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 shall use non-CFC refrigerant and shall cool compressed air to dry the air. Dryer operating pressure shall be not less than 125 PSI (862 kPa) gage. Dryer size shall be based on system pressure, the entire system air flow, and provide 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 shall not exceed 2 PSI (13.8 kPa) gage.

D209005 1.3 COMPRESSED AIR PIPING SYSTEM

Piping shall conform to the requirements of ASME B31.1 for materials, assembly, and testing. Piping shall be steel, black seamless schedule 40 carbon steel per ASTM A 53/A 53M with threaded fittings or copper tubing per 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. Each air drop shall be equipped with a filter/moisture separator, pressure gauge, air pressure regulator, and a quick-disconnect.

-- End of Section --

SECTION D30

HVAC
03/10

D30 GENERAL

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 3-400-10N, *Mechanical Engineering*

UFC 3-420-01, *Plumbing Systems*

UFC 3-440-04N, *Solar Heating of Buildings and Domestic Hot Water*

UNIFIED FACILITIES GUIDE SPECIFICATIONS (UFGS)

UFGS 01 78 24.05 20, *Facility Operation and Maintenance Support Information*

UFGS 23 05 93, *Testing, Adjusting, and Balancing for HVAC*

UFGS 23 09 23.13 20, *BACNET Direct Digital Control Systems for HVAC*

UFGS 23 81 23.00 20, *Computer Room Air Conditioning Units*

D30 1.3 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

a. Verification of satisfactory HVAC system performance shall 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 shall provide the Acceptance Tests and Inspections test plan and perform the acceptance tests and inspections. Test methods, procedures, and test values shall be performed and evaluated in accordance with appropriate

standards, and the manufacturer's recommendations. Equipment shall be placed in service only after completion of required tests and evaluation of the test results have been completed. Contractor shall 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 UFGS Specification Section 01 45 00.05 20, *Design & Construction Quality Control* and Specification Section 23 08 00.00 10 *Commissioning of HVAC Systems*. The Designer of Record shall prepare UFGS Specification Section 23 08 00.00 10 as a part of the project specification and shall include the prepared specification section in the design submittal for the project. HVAC system commissioning shall coordinate with and incorporate the testing, reporting, training & O&M documentation requirements of UFGS 23 05 93, *Testing, Adjusting, and Balancing for HVAC* and UFGS 23 09 23.13 20, *BACnet Direct Digital Control Systems for HVAC*.

D30 1.5 DESIGN SUBMITTALS

Design Submittals shall be in accordance with Z10, *General Performance Technical Specifications*, UFGS section 01 33 10.05 20, *Design Submittal Procedures*, UFC 1-300-09N, *Design Procedures*, and UFC 3-400-10N, *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 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 01 78 24.05 20, *Facility Operation and Maintenance Support Information*

UFGS 23 08 00.00 10, *Commissioning of HVAC Systems*

UFGS 23 09 23.13 20, *BACnet Direct Digital Control Systems for HVAC*

UFGS 23 05 93, *Testing, Adjusting, and Balancing for HVAC*

UFGS 48 14 13.00 20, *Solar Liquid Flat Plate 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) shall 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

Single-phase fractional-horsepower alternating-current motors shall 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 shall meet or exceed energy efficient ratings per 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, the manufacturer shall provide controllers including the required monitors and timed restart. Provide reduced voltage starters for all motors 25 hp and larger.

D3010 ENERGY SUPPLY

D301001 OIL SUPPLY SYSTEM

Conform to requirements of International Mechanical Code for piping. Conform to requirements of NFPA 31 for testing. Contractor is responsible for providing the complete oil supply system to the facility, including any applications and permits.

D301001 1.1 OIL SUPPLY SYSTEM PIPING & EQUIPMENT

ASTM A 53/A 53M or ASTM A 106/A 106M piping with associated ASME fittings or ASTM B 88, type L or M copper tubing with ASME B16.26 flared fittings or compression type fittings. Provide welded fittings on piping below grade. Pumps that are not part of the burner assembly shall be positive displacement type. Provide oil filter prior to oil entering appliance or pump. Storage tanks shall meet the requirements of NFPA 31.

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. Contractor is responsible for providing 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 per 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 per 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 shall 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 shall be detectable by an electronic detection instrument. Polyethylene Fittings shall 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 shall 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 3-440-04N *Solar Heating of Buildings and Domestic Hot Water*. Each system shall 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 shall be designed, built, and tested by this contractor who shall be 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 shall 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 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.

D302001 1.1 REQUIREMENTS

Boiler shall be designed, tested, and installed per ASME CSD-1 (Controls and Safety Devices) and ASME BPVC (Boiler and Pressure Vessel Code). The boiler shall meet the requirements of the UL 795, ANSI Z83.3, and ASME CSD.

D302001 1.2 BOILER BURNER

Burners provided shall be the make, model and type certified and approved by the manufacturer of the boiler being provided. Burner controls and flame safety equipment shall conform 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. Location of the separate panel shall be 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 specification UFGS 23 09 23.13 20.

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 STEAM BOILERS

Steam boilers shall meet the requirements of hot water boilers, except as follows.

D302001 1.4.1 Pressure Gages

Provide pressure gages with a scale equivalent to 1.5 times the outlet water pressure on boiler feedwater supply piping and

condensate return water piping. Provide boiler steam pressure gage with scale equivalent to 1.5 times the boiler rated working pressure.

D302001 1.4.2 Thermometers

Provide thermometers with a scale equivalent to 1.5 times the outlet water temperature on boiler feedwater piping and return water piping.

D302001 1.5 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 1.6 BOILER STARTUP AND OPERATIONAL TESTS

D302001 1.6.1 Boiler Cleaning

Prior to startup, clean boiler(s) in accordance with ASME *Boiler and Pressure Vessel Code* and manufacturer's recommendations.

D302001 1.6.2 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.

D302003 FUEL-FIRED UNIT HEATERS

D302003 1.1 GAS-FIRED UNIT HEATERS

ANSI Z83.8 and AGA label. Equip each heater with individually adjustable package discharge louver. Provide with thermostat.

D302003 1.2 INFRARED HEATERS

ANSI Z83.8 and AGA label.

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

Air-cooled chillers shall be type indicated in Project Program and meet the requirements of AHRI 550/590. 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 specification UFGS 23 09 13.13 20.

D303001 1.1.1 Stages

Provide continuous variable speed compressor adjustment to match actual load, or minimum of four stages of unloading at 25% per stage minimum for reciprocating, centrifugal, and scroll chillers. Provide reciprocating 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. 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 specification 23 09 23.13 20.

D303001 1.3 COOLING TOWERS

Factory assembled, conforming to NFPA 214. Fire hazard rating for plastic impregnated materials shall not exceed 25. Provide Cooling Technology Institute 201 certification of tower capability and performance. Cooling Tower performance shall 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.

D303001 1.4 CLOSED CIRCUIT COOLERS

Factory assembled, conforming to NFPA 214. Fire hazard rating for plastic impregnated materials shall not exceed 25. Provide Cooling Technology Institute 201 certification of tower capability and performance. Cooler performance shall 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 HEAT PUMPS

D303002 1.1.1 Air to Air

Air-cooled, split system heat pumps with ducted air distribution. Provide units factory assembled, designed, tested, and rated in accordance with AHRI 210/240 or AHRI 340/360. Provide manufacturer's minimum recommended clearance around condensing units. Refrigerant piping size shall be per the manufacturer's recommendations. Insulate refrigerant piping suction lines and condensate drain.

D303002 1.1.2 Water Source

Factory assembled, designed, tested, and rated in accordance with AHRI/ISO 13256-1 or AHRI/ISO 13256-2. Unit shall be AHRI/ISO 13256-1 or AHRI/ISO 13256-2 certified, or listed in the AHRI/ISO 13256-1 or AHRI/ISO 13256-2 directory.

D303002 1.1.3 Ground-Coupled

Factory assembled, designed, tested, and rated in accordance with AHRI/ISO 13256-1 or AHRI/ISO 13256-2. Unit shall be AHRI/ISO 13256-1 or AHRI/ISO 13256-2 certified, or listed in the AHRI/ISO 13256-1 or AHRI/ISO 13256-2 directory. Ground-coupled heat pumps shall be connected to the heat exchanger by a closed loop ground source vertical well field. Design and installation of each well field shall comply with IGSHPA and ASHRAE Standards.

D303002 1.2 CONDENSING UNITS

Air-cooled, split system air conditioner with ducted air distribution. Provide units factory assembled, designed, tested, and rated in accordance with AHRI 210/240 or AHRI 340/360. Provide manufacturer's minimum recommended clearance around condensing units. Refrigerant piping size shall be per the manufacturer's recommendations.

D303002 1.3 DX VARIABLE AIR VOLUME (VAV) UNITS

Direct expansion equipment shall be specifically designed and manufactured for VAV applications. The same manufacturer shall provide

central air handling units, VAV boxes/zone dampers and zone controls. Airflow through the evaporator coils shall not be modulated. Provide duct mounted zone control damper units with integral control box, designed for use with DX VAV packaged systems. Self-modulating air diffusers will not be allowed.

D303002 1.4 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. Refrigerant piping size shall be per the manufacturer's recommendations. Insulate refrigerant piping suction lines and condensate drain.

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 per 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 shall be UL 181 listed and per SMACNA 1966 duct construction standards with a minimum R value of 4. Maximum length of flexible ductwork shall be 6 feet (2 meters).

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 shall conform to SMACNA 1966 duct construction standards and shall be seal class "A" construction.

D304001 1.1.4 Fire Dampers

Fire dampers shall be rated per UL 555. Fire dampers shall 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 shall be rated per 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 shall not exceed 0.63 inch of water (157 Pa).

D304001 1.2 LOUVERS & HOODS

D304001 1.2.1 Louvers

Louvers shall bear AMCA ratings seal for air performance and water penetration in accordance with AMCA 500L and AMCA 511. Louvers shall be constructed of anodized aluminum alloy or stainless steel. Provide birdscreens.

D304001 1.2.2 Hoods

Hoods shall be constructed of anodized aluminum alloy or stainless steel. Provide with birdscreens.

D304001 1.3 GRILLES, REGISTERS, & DIFFUSERS

Factory-finished grilles, registers, and diffusers. Exterior and exposed edges shall 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 shall not exceed 25/50. Minimum insulation thickness shall 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 per AHRI 880. Boxes shall 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 per 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

Steam piping shall be 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

Condensate return piping shall be 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 3-400-10N.

D304003 HOT WATER DISTRIBUTION SYSTEMS

D304003 1.1 HOT WATER PIPING

Hot water piping shall 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.

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. Grooved joint pipe coupling systems of appropriate pressure rating are acceptable in lieu of welded or screwed fittings.

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). Valves shall be located 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.

D304004 CHANGEOVER DISTRIBUTION SYSTEMS

Provide as specified for Hot Water Distribution Systems see D304003.

D304005 GLYCOL DISTRIBUTION SYSTEMS

Provide as specified for Chilled Water Distribution Systems see D304006.

D304006 CHILLED / CONDENSER WATER DISTRIBUTION SYSTEMS

D304006 1.1 ABOVEGROUND CHILLED AND CONDENSER WATER PIPING

Aboveground chilled water piping shall 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). Valves shall be located 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) or Polyisocyanurate insulation (ASTM C 591, type I). Flexible unicellular insulation may be used on small piping runouts. 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

Fans shall be AMCA 210 certified, with AMCA seal. Fan bearings shall 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.

D304007 1.4 ROOFTOP FANS

UL-Listed centrifugal fans with roof curb.

D304007 1.5 UTILITY SETS

AMCA 210 with AMCA seal.

D304007 1.6 BATHROOM FANS

UL 507 and UL-listed, Home Ventilating Institute (HVI) certified and with AMCA seal for ceiling installation.

D304007 1.7 RANGE HOODS

UL 507 and UL-listed, with AMCA seal, range hood with light over stove. Minimum fan capacity shall be 160 cfm with maximum sound level of 5.6 sones.

D304008 AIR HANDLING UNITS

AMCA 210 certified fans with AMCA seal. Fan bearings shall 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% outside air units provide capability for

cooling, heating, dehumidification and reheat.

D304008 1.1.1 Ultraviolet Disinfection System

For central station air handling units provide an ultra violet c-band (UVC) disinfection system for mold, bacteria, and odor control in each air handler that has a chilled water or DX cooling coil. Irradiation-emitters and fixtures are to be installed in sufficient quantity and in such an arrangement so as to provide an equal distribution of UVC energy on the coil and in the drain pan. To maintain energy efficiency, the UVC energy produced shall be of the lowest possible reflected and shadowed losses. Energy Efficiency - Power supplies shall be of the high efficiency electronic type and matched to the emitter. Intensity - The minimal UVC energy striking the leading edge (if installed upstream) or trailing edge (if installed downstream) of all the coil fins shall not be less than 820 ÂµW/cm2 at the closest point and through placement, not less than 60% of that value at the farthest point. Equal amounts are to strike the drain pan, either directly or indirectly through reflection. The foregoing sets the placement and minimum quantity of fixtures to be installed. Installation - emitters and fixtures shall be installed at right angles to the conforming lines of the coil fins, such that through incident angle reflection, UVC energy bathes all surfaces of the coil and drain pan as well as all of the available line of sight airstream. One complete set of spare bulbs will be supplied.

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. All air handling unit and pump VFD's shall be from the same manufacturer. Each VFD shall include motor starter, motor disconnects and controls as required for a complete system. Units shall 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 CHILLED WATER AND HOT WATER 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 3-400-10N.

D304090 1.6 MAKE-UP WATER STATION

Station shall consist of a water pressure-reducing valve, filter, and 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 GLYCOL MAKE-UP STATION

If required, provide a glycol makeup system to maintain system proper operating mixture.

D304090 1.8 CONDENSATE DRAIN PIPING

ASTM B 88, Type M or L, hard drawn copper.

D304090 1.9 CONDENSATE DRAIN INSULATION

Insulate condensate drain piping with flexible cellular insulation.

D304090 1.10 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 shall 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 1.11 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 1.12 PIPE SLEEVES

Provide pipe sleeves at each wall and floor penetration. The sleeve shall 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 1.13 SYSTEM FLUSHING

Thoroughly flush hydronic systems prior to system startup. Isolate coils during initial flushing until water is clear.

D304090 1.14 HEAT TAPE

UL-Listed, self-regulating, heat tape on piping subject to freezing.

D3050 TERMINAL & PACKAGE UNITS

D305002 UNIT HEATERS

See D302004 for gas fired unit heaters.

D305002 1.1 STEAM

UL-Listed, factory assembled, unit heaters.

D305002 1.2 HOT WATER

UL-Listed, factory assembled, unit heaters.

D305002 1.3 CABINET UNIT HEATER

UL-Listed, factory assembled, heaters.

D305003 FAN COIL UNITS

UL-Listed, factory assembled and tested fan coils, AHRI 440 and AHRI certified.

D305004 FIN TUBE RADIATION

D305004 1.1 FIN TUBE RADIATORS AND CONVECTORS

Fin tube radiators and Convectors shall be provided with copper tubes and aluminum fins. Provide normally open, spring return control valves.

D305005 ELECTRIC HEATING

D305005 1.1 UNIT HEATERS

Factory assembled, UL-1025, unit heaters.

D305005 1.2 BASEBOARD HEATERS

Factory assembled, UL-1042, heaters.

D305005 1.3 WALL HEATERS

Factory assembled, UL-1025, cabinet heaters.

D305005 1.4 INFRARED HEATERS

Factory assembled, UL-Listed and labeled heaters.

D305006 PACKAGE UNITS

D305006 1.1 ROOFTOP AIR HANDLERS

Factory packaged units in accordance with AHRI 430 and suitable for outdoor installation. Provide with manufacturer's roof curb.

D305006 1.2 DUCT HEATER

Factory assembled, UL-listed heaters. Provide control cabinet and heating coil.

D3060 CONTROLS AND INSTRUMENTATION

D306001 HVAC CONTROLS

D306001 1.1 DIRECT DIGITAL CONTROLS

The Designer of Record shall use UFGS Section Camp Lejeune Guide Specification 23 09 23. 13 and submit the edited specification section as a part of the project design submittal.

Design requirements shall be in accordance with all specification notes and the BAS Owner shall be identified and designated early in the design documentation.

The system shall have 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.

Provide separate instrumentation for continuous measurements and accumulated totals of building electric energy (kwh), electric energy for power (kwh), natural gas for domestic water heating (cubic ft), natural gas for heating (cubic ft), building domestic water (ccf), solar hot water, harvested rainwater (ccf), domestic water makeup to the harvested rainwater system (ccf). Instrumentation shall comply with specifications sections 23 09 23.13 20 (BACnet DDC Systems) for electric meters, 33 51 15 (Natural Gas) for gas meters, 22 00 00 (Plumbing) for water meters.

Store subtotals of these energy values to the present, by the month, and by the year.

Provide Trending as described in specifications section 23 09 23.13 20 for the instantaneous values of measurements that accumulate the energy values described above. That is, make available for indication on the monitor, and record instantaneous values of power (kw), gas flow (cubic ft per hour), and water flow (cubic ft per hour), as applicable. Note that Trending shall not be limited to these variables but shall be applied as described in the "Trending" section of 23 09 23.13 20.

All 120-volt wiring shall comply with NFPA 70. All 24-volt wiring shall 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 23.13 20. All operator workstation functions requiring BACnet services, i.e., navigating through the graphic displays, trending, alarming and monitoring of the new controls system must be demonstrated 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 shall 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 shall prepare UFGS Specification Section 23 05 93, as a part of the project specification and shall 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 3-400-10N, *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 shall be aluminum or a lightweight polymer coated with a corrosion-resistant finish. Etched or oxidized surfaces are not acceptable. Heat transfer surfaces shall be coated with a non-migrating (permanently bonded) absorbent specifically developed for the selective transfer of water vapor. Equal sensible and latent recovery efficiencies shall be documented through a certification program

conducted per ASHRAE 84 and AHRI 1060. The energy recovery wheel shall 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 shall alarm the HVAC control system. Filter sections shall 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 shall 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 shall be used as the working fluid. Type I refrigerants are not allowed.

-- End of Section --

SECTION D40

4/08

D40 GENERAL

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 1.2 QUALITY ASSURANCE

Materials and assemblies installed in the work shall 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 shall be removed, or corrective measures taken, to assure compliance with the referenced standard.

Qualifications, Training Plans, and Test Plans and Procedures indicated herein, shall be submitted 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 shall be as specified in UFC 3-600-01 and UFC 3-600-10N. The FPDOR shall 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 shall 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 shall 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 shall 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 shall be regularly engaged in the installation of the type and complexity of system specified in the Contract documents, and shall 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 shall 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 shall be a U.S. Registered Fire Protection Engineer (FPE) and shall be an integral part of the Prime Contractor's Quality Control Organization. This FPE shall have no 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 shall 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 shall be 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 shall 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 shall 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 shall 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

All systems shall have operational tests to demonstrate compliance with contract requirements and respective NFPA codes, International Building Code and as noted below. Test procedures shall 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 shall personally witness all preliminary inspections of fire alarm/detection and suppression systems. Once preliminary inspections have been successfully completed, the FPQC Specialist shall 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 shall submit the request for formal inspection at least 15 days prior to the date the inspection is to take place. The QC manager shall 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 shall 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 shall summarize all life safety and fire protection features, and shall bear the professional seal of the FPQC Specialist.

D40 1.2.2.3 System Manufacturers Representatives

The systems manufacturer technical representative shall be present for the final inspection and test for the following systems: fire alarm and detection, fire pump, carbon dioxide, foam generating and clean agent extinguishing.

D40 1.2.2.4 Fire Suppression Water Supply and Equipment

The fire hydrants shall be inspected prior to backfilling

the trench surrounding the fire hydrants. A report, including pictures, shall be provided to the Contracting Officer.

Fire pump tests shall be conducted in the presence of the pump, controller, and engine manufacturer technical representatives. The fire pump manufacturer shall also be present for the preliminary test of the fire pump system.

D40 1.2.2.5 Kitchen Hood Fire Extinguishing Systems

The kitchen hood fire extinguishing system shall contain water for the actual performance testing. The nozzles may be bagged in order to minimize damage from water spray.

D40 1.2.2.6 Spray-Applied Fire Proofing and Fire Stopping

See Section C1030 for requirements.

D40 1.2.3 Training

The contractor shall provide training for the active systems within 6 weeks of final acceptance of the systems. The training shall be scheduled at least 2 weeks in advance.

D40 1.3 DESIGN SUBMITTALS

Design Submittals shall be in accordance with Z10, *General Performance Technical Specifications*, UFGS section 01 33 10.05 20, *Design Submittal Procedures*, UFC 1-300-09N, *Design 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) shall 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 shall 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 shall require the approval of the Contracting Officer. The FP DOR shall conduct additional flow tests after contract award prior to any design submissions. Tests shall be conducted under the supervision of the Contracting Officer.

D4040 SPRINKLERS

D404001 SPRINKLERS & RELEASING DEVICES

D404001 1.1 DESCRIPTION

Areas subject to freezing shall be provided with a dry pipe system. 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).

D4090 OTHER FIRE PROTECTION SYSTEMS

D409004 HOOD & DUCT FIRE PROTECTION

Exhaust hoods with grease extractors listed by UL or FM are not required to have protection downstream of the grease extractor.

-- End Of Section --

SECTION D50

ELECTRICAL
03/10

D50 GENERAL

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

UNITED FACILITIES CRITERIA (UFC)

UFC 3-501-01, *Electrical Engineering*

UFC 4-722-01, *Dining Facilities*

UNITED FACILITES GUIDE SPECIFICATIONS (UFGS)

UFGS 26 20 00, *Interior Distribution System*

UFGS 26 23 00, *Switchboards and Switchgear*

UFGS 26 29 23, *Variable Frequency Drive Systems Under 600 Volts*

UFGS 26 32 13.00 20, *Single Operation Generator Sets*

UFGS 26 33 53.00 20, *Uninterruptible Power Supply (UPS)*

UFGS 26 36 23.00 20, *Automatic Transfer Switches*

UFGS 26 41 00, *Lightning Protection System*

UFGS 26 51 00, *Interior Lighting*

UFGS 27 10 00, *Structured Telecommunications cabling and pathway system*

UFGS 27 21 00, *Intercommunication System*

UFGS 27 54 00, *Community Antenna Television (CATV) Systems*

UFGS 28 16 00.00 20, *Basic Intrusion Detection Systems (IDS)*

UFGS 28 20 00.00 20, *Electronic Security System (ESS), Commercial*

D50 1.3 QUALITY ASSURANCE

Qualifications, certifications, and Test Plans indicated herein shall be submitted 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

Contractor shall 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 shall be independent of the supplier, manufacturer, and installer of the equipment. The organization shall be a first tier subcontractor.

Submit name and qualifications of organization. Organization shall have been regularly engaged in the testing of electrical materials, devices, installations, and systems for a minimum of 5 years. The organization shall have a calibration program, and test instruments used shall 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 shall 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 shall be 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 Telecommunications Worker

All installers assigned to the installation of telecommunications systems or any of its components shall 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 1.3.4 Material Standards

Ensure service support and provide manufacturer's nameplate in accordance with PTS Section Z10, *General Performance Technical Specification*.

D50 1.3.4.1 Warning Labels

Provide arc flash warning labels.

D50 1.3.4.2 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 shall be matte finish. Corners shall be square. Accurately align lettering and engrave into the core. Minimum size of nameplates shall be 1-inch by 2-1/2 inches (25 mm by 65 mm). Lettering shall be a minimum of 0.25 inch (6.35 mm) high normal block style.

D50 1.3.5 Factory Testing

The Government reserves the right to witness all factory testing. The manufacturer shall have a calibration program that assures that all applicable test instruments are maintained within rated accuracy.

D50 1.3.6 Electrical System Startup and Testing

Submit test plans for approval. The test plans shall be tailored to the systems provided.

The test plan shall list make and model and provide functional description of the test instruments and accessories and shall describe the setup of the tests to be conducted. Test instruments shall 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 1.3.6.1 Factory Trained Engineer

Provide a factory trained engineer to supervise start-up and testing as required in referenced specifications.

D50 1.3.6.2 Performance Verification Testing

The Contractor shall show by demonstration in service that all circuits and devices are in operating condition. Tests shall be such that each item of control equipment will function not less than five times. The Contractor shall provide all necessary test equipment, tools, fuel, load banks, labor, and materials for testing. As a minimum, all systems shall be tested in accordance with manufacturer's

recommendations. Additional testing requirements for the various systems are described with those systems, hereinafter. The Contractor shall assure that all applicable test instruments are maintained within rated accuracy. Dated calibration labels shall 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 control centers and motor starters in accordance with NETA ATS.
c. Transient voltage surge suppressors (TVSS) -

   1) Inspect for physical damage and compare nameplate data with the drawings and specifications, if applicable. Verify from the nameplate data that the TVSS equipment is appropriate for the system voltage.

   2) Verify lead length between the TVSS equipment and the circuit connection is less than one foot.

   3) Verify wiring between the TVSS equipment and the circuit connection does not include high-inductance coils or sharp bends.

   4) Confirm circuit breaker used for TVSS circuit connection is sized in accordance with TVSS manufacturer's requirements.

   5) Ensure TVSS equipment is grounded in accordance with TVSS 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 TVSS equipment with visual indications of proper operation, verify that it displays normal operating characteristics.
d. Busway - Conduct standard tests for busway in accordance with NETA ATS.
e. Receptacles - Test GFI receptacles with a UL 1436-certified outlet circuit tester to verify correct operation.
f. 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 shall be burned in at full light output for 100 hours before dimming.
g. Telecommunication - Test telecommunications systems in accordance with applicable EIA/TIA requirements.
h. Public address and intercommunications systems - Tests

shall include originating and accepting messages at each station, at proper volume levels, without cross-talk or noise from other links or non-designated units. Test shall utilize the phonetically balanced monosyllabic work intelligibility test in accordance with ANSI S3.2 (ASA 85). In order to be acceptable, a score of at least 75 percent must be obtained for each system test.

i. 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 shall define tests required to ensure that the system meets technical, operational, and performance specifications. Test plan shall include plan for testing for signal leakage.

j. Electronic security systems (ESS) - Test ESS in accordance with UFGS requirements.

k. Grounding systems - Test the grounding system in accordance with NETA ATS.

l. Lightning protection - Upon completion of the installation, Contractor shall furnish the UL Lightning Protection Inspection Certificate certified to UL 96A for the system.

m. 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.

D50 1.3.6.3 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 shall provide the Acceptance Tests and Inspections test plan and perform the acceptance tests and inspections. Test methods, procedures, and test values shall 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. Equipment shall be placed in service only after completion of required tests and evaluations of the test results have been completed. Contractor shall 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

Design Submittals shall be in accordance with PTS Section Z10, *General Performance Technical Specifications*, UFGS Section 01 33 10.05 20,

Design Submittal Procedures, UFC 1-300-09N, *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, *Switchboards and Switchgear*

UFGS 26 29 23, *Variable Frequency Drives System Under 600 Volts*

UFGS 26 32 13.00 20, *Single Operation Generator Sets*

UFGS 26 36 23.00 20, *Automatic Transfer Switches*

UFGS 26 32 26, *Motor Generator Sets, 400 Hertz*

UFGS 26 35 43, *400 Hertz Frequency Converters*

UFGS 28 20 00.00 20, *Electronic Security System (ESS), Commercial*

UFGS 11 13 10, *Dock Levelers*

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) shall 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.

D5010 ELECTRICAL SERVICE AND DISTRIBUTION

D501001 MAIN TRANSFORMERS

Pad mounted distribution transformers shall be in accordance with PTS Section G40, *Site Electrical Utilities*.

D501002 SERVICE ENTRANCE EQUIPMENT

When a switchboard or switchgear is required, the Designer of Record shall utilize UFGS Section 26 23 00 for the project specification, and shall submit the edited specification section as a part of the design submittal for the project.

D501003 INTERIOR DISTRIBUTION TRANSFORMERS

D501004 PANELBOARDS

Panelboards shall comply with UL 67 and UL 50. UL 869A shall apply if used as service entrance equipment. Panelboards for non-linear loads shall 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 shall comply with UL 943. Arc fault circuit breakers shall comply with UL 489 and UL 1699.

D501005 ENCLOSED CIRCUIT BREAKERS

Provide molded case circuit breakers in accordance with UL 489. UL 869A shall apply if used as service entrance equipment. Provide with solid neutral when grounded conductor is present.

D501006 MOTOR CONTROL CENTERS

Motor control centers shall comply with UL 845, NEMA ICS 2, and NEMA ICS 3. Motor controllers shall 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 shall utilize UFGS Section 26 29 23 for the project specification, and shall submit the edited specification section as a part of the design submittal for the project.

D501090 OTHER SERVICE AND DISTRIBUTION

D501090 1.1 TRANSIENT VOLTAGE SURGE SUPRESSORS (TVSS)

D501090 1.2 BUSWAY

Busway shall comply with NEMA BU 1 and UL 857.

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.

Switches shall comply with NEMA WD-1 and UL 20.

D502002 LIGHTING EQUIPMENT

Installation shall meet requirements of manufacturer's recommendations and the additional requirements for "Severe Seismic Disturbance" contained in ASTM E 580. Fixture support wires shall conform with ASTM A 641/A 641M, galvanized regular coating, soft temper.

D502002 1.1 BALLASTS

All Fluorescent ballasts shall be programmed start unless otherwise indicated. Electronic ballasts shall include a 5-year warranty.

D5030 COMMUNICATIONS AND SECURITY

D503001 TELECOMMUNICATIONS SYSTEMS

D503002 PUBLIC ADDRESS SYSTEMS

D503003 INTERCOMMUNICATIONS SYSTEMS

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 SECTURITY SYSTEMS (ESS)

When an ESS system is required, the Designer of Record shall utilize UFGS Section 28 20 00.00 20 for the project specification and shall submit the edited specification section as a part of the design submittal for the project.

D503005 1.2 PROTECTED DISTRIBUTION SYSTEMS (PDS)

Protected Distribution Systems shall be 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 shall be in accordance with the Director of Central Intelligence Directive (DCID) 6/9.

D503090 OTHER COMMUNICATIONS AND ALARM SYSTEMS

D5090 OTHER ELECTRICAL SERVICES

D509001 GENERAL CONSTRUCTION ITEMS (ELECTRICAL)

D509002 EMERGENCY LIGHTING AND POWER

D509002 1.1 EMERGENCY LIGHTING

D509002 1.2 EMERGENCY GENERATORS

When an emergency generator is required, the Designer of Record shall utilize UFGS Section 26 32 13.00 20 for the project specification, and shall submit the edited specification section as a part of the design submittal for the project.

D509002 1.3 AUTOMATIC TRANSFER AND BYPASS/ISOLATION SWITCHES

When an Automatic Transfer Switch is required, the Designer of Record shall utilize UFGS Section 26 36 23.00 20 for the project specification,

and shall submit the edited specification section as a part of the design submittal for the project.

D509002 1.4 UNINTERRUPTIBLE POWER SUPPLY (UPS) SYSTEM

When a UPS system is required, the Designer of Record shall utilize UFGS Section 26 33 53.00 20 and shall submit the edited specification section as a part of the design submittal for the project.

D509003 GROUNDING SYSTEMS

D509004 LIGHTNING PROTECTION

D509005 ELECTRIC HEATING

D509006 ENERGY MANAGEMENT CONTROL SYSTEM

D509007 PHOTOVOLTAIC (PV) POWER SYSTEMS

Furnish and install Photovoltaic Power system. All work shall be performed by a qualified contractor with a minimum of 5 years of experience in the design and installation of the PV module-based systems with a minimum size 200 kW inverters. The Contractor shall design the PV systems using the necessary available roof areas. Power from the PV system(s) is required to be connected to the Base power grid.

PV panel (module) shall have Peak Power (Pmax) of 230 W, max system open circuit voltage (VUL) not to exceed 600 VDC per UL, Peak Power/Unit area 17.2 W/Sq. Ft, Nominal Power/Unit area 15.33 W/Sq. Ft.

D509090 OTHER SPECIAL SYSTEMS AND DEVICES

D509090 1.1 400 HERTZ SYSTEMS

The Designer of Record shall utilize UFGS Section 26 32 26 or UFGS Section 26 35 43 for the project specification, and shall submit the edited specification section as a part of the design submittal for the project.

-- End of Section --

SECTION E10

EQUIPMENT
4/08

E10 GENERAL

E10 1.1 GENERAL REQUIREMENTS

Where required by the project program, the contractor shall obtain the services of equipment specialists to specify any audiovisual, shop, fitness equipment, or other specialty equipment. Equipment specialists shall not have any affiliation with the product specified. All specialty equipment will 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 Construction Criteria Base (CCB) at the Whole Building Design Guide 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 3-100-10N, *Architecture*

UFC 3-120-10, *Interior Design*

E10 1.3 PERFORMANCE VERIFICATION AND COMPLIANCE TESTING

Verification of satisfactory special equipment and furnishing systems performance shall be 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 shall 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 shall 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 shall 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

Design Submittals shall be in accordance with UFGS section 01 33 10.05 20, *Design Submittal Procedures*, UFC 1-300-09N, *Design Procedures*, UFC 3-100-10N, *Architecture*, 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) shall approve the following construction submittals as a minimum:

Field tests of equipment, vault door, loading dock equipment, kitchen equipment and unit kitchens.

E1010 COMMERCIAL EQUIPMENT

E101005 SECURITY & VAULT EQUIPMENT

E101005 1.1 VAULT AND DOORS

The Vault ("Weapons Storage Area" (WSA) or "Armory", or other title according to the project program) space shall be designed in accordance with criteria in 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 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 shall 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 shall have a minimum of 2 exits for safety purposes. When more than one entrance / exit is required, each shall 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 shall 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 shall 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 shall 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 shall 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 shall 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 shall either be positioned so that it is not accessible from the outside or it shall be operable by key only. Day gate shall include an issue port opening, cover with locking mechanism, and shelf. The issue port shall be a framed opening welded to the day gate frame with a hinged door cover. The hinged door shall be minimum 18 gage (1.2 mm) steel and shall be lockable from the inside only. The opening shall 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 shall match the opening to within 0.0625 inch (1.6 mm). The shelf shall

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 shall 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 shall 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 shall 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 shall 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 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 shall 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 shall be not 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 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 shall be not 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

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 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 may 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 shall service all truck or trailers with 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 UFC 4-722-01, *Dining Facilities*. This paragraph covers the items of commercial food service equipment. Included are items used for liquid and solid food storage, food preparation, 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.

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 - 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, 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 shall 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 shall 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 shall 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 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 shall 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 shall 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 1/3 hp motor.

E109005 UNIT KITCHENS

E109005 1.1 UNIT KITCHENS

Unit kitchens must be complete with countertops, sinks, faucets, appliances, and accessories. Comply with UFAS/ADAAG in units for the disabled. Provide high pressure laminate or natural wood finish.

E109005 1.2 UNIT KITCHEN COMPONENTS

a. Cabinets - ANSI/FCMA 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 shall 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
03/10

E20 GENERAL

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 Construction Criteria Base (CCB) at the Whole Building Design Guide 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 03-100-10, *Architecture*

UFC 03-120-10, *Interior Design*

UFC 1-300-09N, *Design Procedures*

UFC 4-722-01 Dining Facilities

E20 1.2 GENERAL REQUIREMENTS

The Contractor shall have 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 FF&E and the SID Package and participate in any design charettes to develop the building floor plan. As required, the Contractor shall obtain services of equipment specialists to specify the audiovisual, shop, or specialty equipment. The Interior Designer and any specialists shall 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.

E20 1.3 DESIGN SUBMITTALS

Design Submittals shall be in accordance with Z10, *General Performance Technical Specifications*, UFGS section 01 33 10.05 20, *Design Submittal Procedures*, UFC 1-300-09N, *Design Procedures*, and UFC 03-120-10, *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) shall 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 shall be one-inch horizontal room-darkening commercial grade aluminum at a minimum thickness of 0.008-inch (0.2 mm) (after coating) with a minimum of 15 slats per foot (45.72 slats per meter). Blinds shall be provided at each exterior window and at any interior window where privacy may be required. One full size sample shall be provided and installed for review and approval.

E201002 1.2 SHADES

Provide energy efficient solar shading systems for exterior windows. The system shall maintain visibility while reducing glare, solar heat gain during the summer and heat loss during the winter. Openness configuration shall be no more than 5% for most areas. The system fabrics and components shall be dimensionally stable and shall be manufactured to withstand fading, fire, mildew, and soiling.

E201002 1.3 DRAPERIES AND HARDWARE

Draperies shall be manufactured under BPA 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 shall meet the NFPA Code 701 California Fire Marshall’s flame retardant requirements.

E201003 SEATING (FIXED)

E201003 1.1 AUDITORIUM, LECTURE AND CLASSROOM SEATING

The system shall 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 shall be placed laterally so the aisle-end standards will be in alignment as indicated on seating layout drawing. The angle of inclination of backs shall be adjusted for variations in sightlines. Mechanical attachment of components shall 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 shall absorb inaccuracies in lateral spacing of standards at point of attachment caused by unevenness of floor. Varying lateral dimensions of backs and seats shall be in accordance with approved seating layout. Minimum width of seating unit shall 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 work surfaces mounted to floor standards shall be tubular steel, sheet steel, or cast iron. The standards shall be formed to fit the floor incline so that the standards will be vertical. The feet shall be formed to eliminate tripping hazards and shall 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 work surfaces with coordinating vinyl or resin edge detail.

E2020 MOVABLE FURNISHINGS

Furnishings, Fixtures, and Equipment (FF&E) shall include furniture, shop equipment, audiovisual equipment, and specialty equipment. Weapon racks, drying cages, and lockers are not considered FF&E. FF&E shall be fully integrated with the building systems and finishes. FF&E may also include specialty items for which the customer activity shall 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. 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 NC tax and the 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 shall 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 and NC taxes 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, markups, etc 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 shall 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. FF&E items are subject to the Buy American Act.

E2020 1.2 PURCHASE AND INSTALLATION

The Contractor shall 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 should anticipate providing a deposit of between 30% to 50% of the furniture costs when placing their order.

The Contractor shall also anticipate possible manufacturer price increases. 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 shall 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 shall 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. Any items purchased as building materials such as carpet are taxable.

E2020 1.2.5 Bonds

FF&E line item is not considered construction and the prime contractor shall 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 contactor’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. The contractor shall 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

All supplies under the FF&E line item are subject to the Buy American Act. The GSA contracts and NAVSUP Blanket Purchase Agreements are required to comply with the Buy American Act.

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 construction contractor.

E2020 1.2.10 Installation Warranty

All movable furnishings shall be installed in accordance with the manufacturer’s instructions and warranty requirements. All movable furnishings shall be level and aligned and all doors, drawers and accessories shall be level and aligned to open, close and otherwise operate smoothly and securely. All systems furniture shall be installed by the systems furniture manufacturer’s dealer of record and not the general Contractor. The Contractor shall 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

Two copies of all ordering documentation shall be provided 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 to 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 is 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 shall 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 FAR 8.404 when placing orders against Federal Supply Schedules for the selection of furniture and furnishings. A 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 $100,000 or less: for any procurement in the FF&E package with a value greater than $3,000 and $100,000 or less, the contractor's interior designer shall 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 $100,000 or less.

Greater than $100,000: The contractor's interior designer shall solicit proposals from all BPA holders under the applicable group for FF&E procurements greater than $100,000. UNICOR must always be solicited. The contractor's interior designer shall 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 $100,000 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 shall 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 shall be to create a fully integrated design solution by providing quality products to meet the functional needs of the customer. Customer preferences shall be considered. The focus shall 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

The Contractor shall 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 1600mm (63 inches) 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 shall maximize each allocated space with work surfaces and overhead closed storage with a surface to accommodate a Government provided computer. An attached articulated keyboard/mouse tray shall be selected or provided. Provide a monitor lift if required by the project program.

Powered raceways that will accommodate data and voice wire management shall be completely coordinated with all facility systems. The Contractor's Interior Designer shall ensure the coordination of all electrical/data and furniture locations. Use of power poles will not be permitted to power FF&E. The Contractor shall 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. The Contractor shall hardwire all pre-wired furniture with the building systems, and coordinate all 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) shall be selected. Wood surfaces shall be provided 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 shall 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 shall be of stainless steel construction. The chairs and tables shall be appropriately sized for each age group.

E202003 1.4 TRAINING/CONFERENCE ROOM FURNISHINGS

E202003 1.4.1 Tables

Provide single or multi-person work surfaces 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 shall be completely coordinated with all facility systems. The Contractor's Interior Designer shall ensure the coordination of all electrical/data and furniture locations. The Contractor shall 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 marker boards with porcelain on steel writing surfaces. Coordinate with building construction to include appropriate blocking or structural support for the installation of marker boards and tack boards.

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, ice makers, and fire extinguishers 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
03/10

G10 GENERAL

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*.

G10 1.1.1 Industry Standards and Codes

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 3-200-10N, *Civil Engineering*

UFC 3-220-01N, *Geotechnical Engineering*

UFC 3-800-10N, *Environmental Engineering for Facility Construction*

UNIFIED FACILITIES GUIDE SPECIFICATIONS (UFGS)

UFGS 31 23 00.00 20, *Excavation and Fill*

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 Section 01 33 10.05 20, *Design Submittal Procedures*, and Section 01 33 00.05 20, *Construction Submittal Procedures*, for additional requirements. Verification of satisfactory earthwork performance shall be via testing detailed in the paragraph, "Field Quality Control", in UFGS Specification Section 31 23 00.00 20, *Excavation and Fill*.

G10 1.3 DESIGN SUBMITTALS

Design Submittals shall be in accordance with UFGS section 01 33 10.05 20, *Design Submittal Procedures*, UFC 1-300-09N, *Design Procedures*, UFC 3-200-10N, *Civil Engineering*, and UFC 3-220-01N.

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 31 23 00.00 20 (02315N), *Excavation and Fill*

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) shall approve the following construction submittals as a minimum:

Submittals in UFGS 01 57 19.05 20 (01577N), Temporary Environmental Controls for Design-Build.

Submittals in UFGS Specification Section 31 23 00.00 20 (02315N), Excavation and Fill.

Demolition plan in accordance with Section 01 74 19, Construction and Demolition Waste Management.

G10 1.5 GEOTECHNICAL REPORT

G10 1.5.1 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 are intended for proposal preparation and preliminary design only. The Contractor shall perform, at his expense, such subsurface exploration, investigation, testing, and analysis as his Designer of Record deems necessary for the design and construction of the site improvements.

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 shall evaluate the RFP data, obtain and evaluate all additional data as required to support the design and construction, and prepare a Geotechnical Report.

All work by the Contractor-provided Geotechnical Engineer at the project location, if required, shall be coordinated with the Contracting Officer and shall 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 editable Adobe Acrobat PDF version on CD and two printed copies) for review and record keeping purposes. The report shall 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 an editable 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 all additional field and laboratory testing accomplished at the discretion of the Contractor's Geotechnical Engineer. The Geotechnical Report shall 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 shall be limited as required in 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 (as applicable), 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, as applicable.

6) Pavement design calculations with parameters defined, actual or assumed, and recommended thicknesses and materials.

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

8) Calculations to support conclusions and recommendations.

9) Recommendations shall be presented on a structure-by-structure basis.

The Geotechnical Report shall be signed by a registered Geotechnical Engineer.

The submitted report shall be accompanied by 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 shall include the Government-provided subsurface data presented in the RFP, as well as any additional borings and laboratory test result data performed by the Contractor. The data provided shall 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. The locations of all borings shall be indicated on the drawings. The applicable design drawings shall be revised 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 as required for project construction.

G1010 1.2 BURNING

Where burning is permitted, adhere to the applicable federal, state, and local regulations.

G101001 CLEARING

G101001 1.1 CLEARING

The Contractor shall clear all trees, shrubs, brush and vegetation necessary for construction of the project. Clearing includes the felling, trimming, and cutting of trees into sections.

G101001 1.2 PRESERVATION

Preserve and protect trees, shrubs and vegetation not directly impacted by the construction in accordance with Section 01 57 19.00 20, *Temporary Environmental Controls*.

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 and grind stumps 18 to 30 inches (450 to 750 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 all 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. Neatly cut limbs and branches to be trimmed close to the bole of the tree or main branches.

G101006 DEBRIS DISPOSAL

Prevent spillage on pavements, streets, or adjacent areas. Dispose of all surplus and unsuitable material off of Government property.

G1020 SITE DEMOLITION & RELOCATIONS

G1020 1.1 GENERAL

Demolition work shall include the demolition, removal and legal disposal of existing construction debris as required to accommodate the new construction. The Contractor shall take care to prevent damages to existing utilities, construction and materials not scheduled for demolition, repair or replacement, and shall 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, all features demolished shall be salvaged or recycled in lieu of being disposed of as waste in a landfill. Existing features to be demolished which are not salvageable or reused, shall become the property of the Contractor and shall be removed from project site. The Government will not be responsible for the condition, loss of, or damage to, such property after contract award. Materials and equipment shall not 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

Salvage materials and equipment that are to be removed by the Contractor and that are to remain the property of the Government, and deliver to a storage site on the station in accordance with instructions of the Contracting Officer.

G102001 BUILDING MASS DEMOLITION

Refer to Section F20 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 as often as necessary 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

G102002 1.2.2 Foreign Object Damage (FOD)

G102002 1.2.3 Existing Work

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 will butt against the existing without feathering.

G102002 1.4 ABOVEGROUND STORAGE TANKS

Perform aboveground storage tank removal work as indicated in the RFP, in accordance with the ESR and the approved aboveground storage tank removal work plan as described in Section 01 57 19.00 20, *Temporary Environmental Controls*.

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 3-200-10N, *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 underground storage tank removal work as indicated in the RFP, in accordance with the ESR and the approved underground storage tank

removal work plan as described in Section 01 57 19.00 20, *Temporary Environmental Controls*.

G102004 BUILDING RELOCATION

Refer to applicable portions of Section F20 for additional information.

G102005 UTILITY RELOCATION

Repair relocated items that are damaged or replace damaged items with new undamaged items as approved by the Contracting Officer and 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 as approved by the Contracting Officer and at no additional expense to the government. Refer to Section G204001 for requirements for new fence systems, as applicable.

G102007 SITE CLEANUP

Remove rubbish and debris from the station 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.

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 for earthwork related to construction of structures, including building, footings, foundations, retaining walls, slabs, tanks, and utility appurtenances.

The Designer of Record shall utilize UFGS Specification Section 31 23 00.00 20, *Excavation and Fill*, for the project specification, and shall submit the edited specification section as a part of the design submittal for the project.

G103001 GRADING

G103001 1.1 ELEVATIONS

Establish finish floor elevations as required by UFC 3-200-10N, *Civil Engineering*.

G103001 1.2 SITE GRADING

The Contractor shall preserve natural topographic features to minimize the impact on the existing drainage patterns at and adjacent to the site. Provide site grading in accordance with the requirements of the UFC 3-200-10N, *Civil Engineering*.

G103001 1.3 FINISHED SURFACES

Finish grading shall provide drainage towards new and existing drainage features. Finish grading shall not result in low spots that hold water or that direct runoff towards new or existing facilities or site

amenities. Finish grading shall be in accordance with the requirements of the UFC 3-200-10N, *Civil Engineering*.

G103002 COMMON EXCAVATION

The Contractor shall preserve natural topographic features to minimize cut and fill requirements. All unsuitable material and surplus excavation shall become the property of the Contractor and shall be disposed of as indicated in the Project Program.

G103003 ROCK EXCAVATION

If blasting is allowed, it shall be conducted in accordance with EM 385-1-1 and Federal, state, and local safety regulations. Blasting mats shall be provided, and non-electric blasting caps shall be used. Notify the Contracting Officer 24 hours prior to blasting.

Requests for additional compensation shall not be made by the Contractor for degree of hardness or difficulty encountered in removal of material. All unsuitable material and surplus excavation shall become the property of the Contractor and shall be disposed of as indicated in 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 UNSATISFACTORY SOIL MATERIALS

Remove unsatisfactory soil materials from the site in accordance with the Project Program and replace with satisfactory soil materials in accordance with UFGS Specification Section 31 23 00.00 20, *Excavation and Fill*.

G103004 1.3 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 Specification 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".

G103008 1.2 RODENT AND VEGETATION CONTROL

Prevent and eliminate standing water.

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 3-220-01N, *Geotechnical Engineering*, UFC 3-301-01N, *Structural Engineering*, and all other applicable Federal, State and local codes and requirements

Provide protection of existing structures.

G103010 TEMPORARY DEWATERING

The design of the temporary dewatering system shall 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 Specification Section 31 23 00.00 20. While the excavation is open, the water level shall be maintained continuously, at least 1.0 foot (0.30 m) below the working level.

French drains, sumps, ditches or trenches will not be permitted within 3 feet (0.9 m) of the foundation of any structure without written approval of the NAVFAC 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 all 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 Section 01 50 00.05 20, *Temporary Facilities and Controls for Design-Build*, in Part 2 of this RFP.

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 all government and nongovernment owners/agencies in

designing and providing the work.

G103090 1.3 TOPSOIL AND SEED

Provide topsoil and seed according to UFGS Specification Section 31 23 00.00 20, *Excavation and Fill*, except when landscaping is required.

G1040 HAZARDOUS WASTE REMEDIATION

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 Section 01 57 19.00 20, *Temporary Environmental Controls*. Areas of contamination shall be excavated to the depth noted elsewhere in the RFP. Select methods and equipment to minimize disturbance to areas beyond the limits of the excavation area. Material that becomes contaminated as a result of the Contractor's operations shall be removed and disposed of at no additional cost to the Government. Where excavation extends into groundwater levels, dewatering methods shall be employed on a localized basis to facilitate excavation operations. Water generated by dewatering during excavation shall be collected and tested in accordance with the ESR and the approved work plan.

Water that contains contaminants above the levels indicated in the ESR shall be disposed of in accordance with the ESR and the approved work plan.

Non-contaminated water may be disposed of on-site.

G1040 1.2 STOCKPILED SOILS

Soils determined to be contaminated in accordance with the criteria in the ESR must be stockpiled in accordance with the contaminated soil and groundwater removal work plan as described in Section 01 57 19.00 20, *Temporary Environmental Controls*, and shall be disposed of 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

Soils that are determined as clean fill via testing shall be backfilled and compacted 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. Containment actions shall be taken immediately to minimize the effect of any spill or leak. Clean up shall be performed at the Contractor's expense in accordance with the ESR and the approved spill work plan as described in Section 01 57 19.00 20, *Temporary Environmental Controls*.

G1040 1.5 DISPOSAL

All waste materials shall become the property of the Contractor and shall be transported, disposed of in accordance with the criteria listed in the ESR and the approved disposal plan as described in Section 01 57

19.00 20, *Temporary Environmental Controls*.

-- End of Section --

SECTION G20

SITE IMPROVEMENTS
4/08

G20 GENERAL

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*.

G20 1.1.1 Industry Standards and Codes

AMERICAN SOD PRODUCERS ASSOCIATION (ASPA)

NATIONAL FEDERATION OF STATE HIGH SCHOOL ASSOCIATIONS (NF)

U.S CONSUMER PRODUCT SAFETY COMMISSION, PUBLICATION NO. 325

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)*

CORPS OF ENGINEERS (COE)

TM 5-822-5, *Pavement Design for Roads, Streets, Walks, and Open Storage Areas*

NAVAL FACILITIES ENGINEERING COMMAND (NAVFACENGCOM)

Military Handbook, MIL-HDBK-1013/14, *Selection and Application of Vehicle Barriers*

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01, *General Building Requirements*

UFC 1-300-09N, *Design Procedures*

UFC 3-200-10N, *Civil Engineering*

UFC 3-201-02, *Landscape Architecture*

UFC 3-210-04, *Children's Outdoor Play Areas*

UFC 3-220-01N, *Geotechnical Engineering*

UFC 3-270-01, O&M: *Asphalt Maintenance and Repair*

UFC 3-270-02, O&M: *Asphalt Crack Repair*

UFC 3-270-03, O&M: *Concrete Crack and Partial Depth Spall Repair*

UFC 3-270-04, O&M: *Concrete Repair*

UFC 3-800-10N, *Environmental Engineering for Facility Construction*

UNITED FACLITIES GUIDE SPECIFICATIONS (UFGS)

32 11 26.16, *Bituminous Concrete Base Course*

32 11 36.13, *Lean Concrete Base Course*

32 11 33, *Cement Stabilized [Base] [Subbase] Course at Airfields and Roads*

32 11 30, *Lime Treated Subgrade [Lime Modified Soils]*

32 11 16.16, *[Base Course for Rigid] [and Subbase Course for Flexible] Paving*

32 11 24, *Graded Crushed Aggregate Base Course for Flexible Pavement*

32 11 16.13, *Sand-Clay [Base] [Subbase] Course*

32 12 17, *Hot Mix Bituminous Pavement*

32 13 13.03, *Airfields and Heavy-Duty Concrete Pavement Less Than 10,000 Cubic Yards*

32 13 13.06, *Portland Cement Concrete Pavement for Roads and Site Facilities*

G20 1.2 QUALITY ASSURANCE

G20 1.2.1 Qualifications of Tree Location Contractor

Contractor shall 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.

G20 1.2.2 Qualifications of New Landscape Contractor

Construction company shall 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 Section 01 33 10.05 20, *Design Submittal Procedures*, and Section 01 33 00.05 20,

Construction Submittal Procedures, for additional requirements.

Verification of satisfactory performance shall be via Performance Verification, as detailed in this section of the RFP. Verification of satisfactory performance shall also be via testing as detailed in the paragraph, Field Quality Control, in applicable 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. Proof rolling shall be performed in the presence of the Contracting Officer. Rutting or pumping of material shall be undercut as directed by the Contracting Officer 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 D 75.
b. Gradation: ASTM C 136.
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 D 1556 or ASTM D 2922 and ASTM D 3017. One field test for every 1000 square yards (836 square meters); minimum 2 tests. ASTM D 1557, Method D; one laboratory test for the project.
e. Visual: Surface shall be smooth 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

a. Visual: Finished surface shall be uniform in texture and appearance and free of cracks and creases.
b. Sampling: ASTM D 979.
c. Job Mix: Determine gradation and bitumen content. One sample for every 400 tons (362,500 kilograms); minimum 1 test.
d. Thickness: ASTM D 3549. 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.
e. 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.
f. Density: Conduct field density of in-place compacted pavement in accordance with ASTM D 2950 and correlated with ASTM D 1188 or ASTM D 2726. 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

a. Visual: Finished surface shall be uniform in texture and appearance and free of cracks.
b. Sampling: ASTM C 31M (ASTM C 31).
c. 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.
d. Surface Smoothness: Test surface smoothness by using a 10 foot (3 meter) straightedge in transverse and longitudinal directions to pavement. The finished surfaces of the pavements shall have no abrupt change of 0.12 inch (3 mm) or more.
e. Strength: Samples for strength tests of each mix design of concrete placed each day shall 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 C 39. 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. Each strength test result shall be 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 C 42/C 42M core samples from the in-place work represented by the low test cylinder results and test. Concrete represented by core test shall be considered 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. Locations represented by erratic core strengths shall be retested.

   2) Flexural Strength: ASTM C 78. 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.
f. 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 type sealant to be used. Obtain approval of test section by Contracting Officer prior to installing additional joint seal. 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 shall be rejected. 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). Additional topsoil shall be used 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

Final inspection shall be made upon written request from the Contractor at least 10 days prior to the last day of the planting and irrigation Establishment Period. The Landscape Contractor shall attend the inspection with the Contracting Officer and document the inspection. The Landscape Architect-of-Record shall 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 all stakes and guy cables.

G20 1.3.8 Landscape and Irrigation Establishment Period and Guarantee

All transplanted trees, newly planted trees, shrubs, ground covers, turf, and irrigation systems shall be guaranteed 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, shall begin the Establishment Period. All 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 shall be replaced with healthy plants of the same species or variety during the appropriate planting season. The Landscape Architect-of-Record shall, along with the Contracting Officer, attend, approve and document the start of the Establishment Period and document quarterly and final inspections. During this period, the Contractor shall perform tasks which shall include, but not be limited to: watering, mowing, overseeding, fertilizing, mulching, pruning, weeding, eradicating pests (rodents, rabbits, insects, mammals and fungus), restaking, adjusting guy wires, adjusting irrigation systems, and replenishing mulch to assure all plant material is in a healthy and thriving condition or the Contractor shall replace plant material at his own expense. Broadcast seeded or hydro-seeded areas that do not achieve the 95-percent coverage by the end of the Establishment Period shall be reseeded by the same method and be maintained an additional 120 days to ensure coverage requirements are met. Turf shall be maintained 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

Design Submittals shall be in accordance with UFC 1-200-01, General Building Requirements, UFGS section 01 33 10.05 20, *Design Submittal Procedures*, UFC 1-300-09N, *Design Procedures*, and UFC 3-200-10N, *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 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*.

32 11 26.16, *Bituminous Concrete Base Course*

32 11 36.13, *Lean Concrete Base Course*

32 11 33, *Cement Stabilized [Base] [Subbase] Course at Airfields and Roads*

32 11 30, *Lime Treated Subgrade [Lime Modified Soils]*

32 11 16.16, *[Base Course for Rigid] [and Subbase Course for Flexible] Paving*

32 11 24, *Graded Crushed Aggregate Base Course for Flexible Pavement*

32 11 16.13, *Sand-Clay [Base] [Subbase] Course*

32 12 17, *Hot Mix Bituminous Pavement*

32 13 13.16, *Portland Cement Concrete Pavement for Roads and Site Facilities*

G20 1.5 CONSTRUCTION SUBMITTALS

Provide product data for all exterior furnishings.

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

Provide product data for all exterior furnishings, field test reports. transporting plan, and irrigation plan.

G20 1.5.1 Transplanting Plan

A transplanting plan shall be submitted for all projects which include transplanting trees. The plan shall be submitted showing existing and proposed locations of transplanted trees. The plan shall delineate methods and times for root pruning, digging, balling, removing, storing, transporting, planting, watering, and maintenance to ensure survivability. The plan shall also include equipment, anti-desiccant, and pesticides to be used. A listing of the plant material to be transplanted shall be provided 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. Measurements shall locate 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); all 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, the Contractor shall determine the exact limit-of-work line for the project periphery, considering items such as, but not limited to, utility work, landscape revegetation of disturbed areas, and laydown areas. The Designer of Record shall determine limit-of-work lines.

G2010 ROADWAYS

G2010 1.1 PAVEMENT DESIGN

Provide geometric and pavement design, including minimum pavement sections, in accordance with UFC 3-200-10N, *Civil Engineering*, and the State Department of Transportation. Provide pavement calculations in accordance with UFC 1-300-09N, *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

Designs for streets and roads shall include adequate space for trees and other landscape material.

G2010 1.4 TRAFFIC CONTROL DEVICES

New traffic control devices (i.e., signsand markings) shall be provided and installed 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". New traffic control devices shall also be provided 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

Existing utility structures shall be adjusted to meet the new finished pavement grades as required.

G201001 BASES & SUBBASES

Prepare subgrade in accordance with Section G10, *Site Preparation*. Geotextiles may be used 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 shall utilize the applicable 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 3-200-10N, Civil Engineering, whichever is more stringent. Where the SHS do not include concrete materials for curbs and gutters, provide concrete in accordance with the applicable 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 shall utilize the applicable 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 applicable 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

Bituminous concrete placement, including minimum temperature during placement, joints, and maximum lift thickness shall be 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 Portland Cement Concrete Pavement

If reinforced, the welded wire fabric shall conform to ASTM A 185. Bar reinforcement shall conform to ASTM A 615/A 615M, Grade 400 (Grade 60).

Provide concrete in accordance with the applicable standard mix of the SHS for the design strength plus any allowable deviations.

G201003 1.2 JOINTS FOR PORTLAND CEMENT CONCRETE PAVEMENT

Joints shall be in accordance with SHS and the applicable portions of TM 5-822-5, *Pavement Design for Roads, Streets, Walks, and Open Storage Areas*. Joints shall be installed in a manner and at such time to prevent

random or uncontrolled cracking. Joints shall 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 D 1751. Filler must be compatible with joint sealer material. Preformed joint filler shall be securely held 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

Joint lines shall be sawed 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 D 5893; Provide single component cold-applied silicone. Silicone sealant shall be self-leveling and non-acid curing.

G201003 1.2.6 Preformed Compression Seals

Use performed 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. Prime coat shall be emulsified asphalt materials.

G201003 1.4 TACK COAT

Tack coat is required for bituminous pavement overlays and on vertical cut faces of pavement patches. Tack coat shall be 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. Thicknesses of pavement materials shall be 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, *O&M: Concrete Crack and Partial Depth Spall Repair*, and UFC 3-270-04, *O&M: Concrete Repair*. Spall repair materials shall be 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. A manufacturer's data sheet and certificate supporting the satisfactory use shall be provided to the Contracting Officer with the design. A product manufacturer's representative shall be present during the initial two days of product application to verify that manufacturer's instructions for use are adhered to. The Contracting Officer shall be given 7 days notice prior to the initial application in order to be present.

G201004 MARKING & SIGNAGE

G201004 1.1 MARKING

Pavement markings shall be in accordance with the SHS. Materials shall be designed for life expectancy of at least 3 years under an average daily traffic count per lane of approximately 9000 vehicles. Water based paints shall 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 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 applicable portions of the *AASHTO Roadside Design Guide*.

G201005 1.2 BOLLARDS

Bollards shall be 4" diameter minimum steel pipe filled with concrete and embedded in a portland cement concrete foundation. Bollards associated with passive barrier systems 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 addition 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 applicable provisions of UFC 3-200-10N, *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

Fiber reinforced crack sealer shall be used for sealing cracks in asphalt pavement after milling and prior to resurfacing. Crack sealing shall conform to the following requirements in UFC 3-270-01, *O&M: Asphalt Maintenance and Repair*, and UFC 3-270-02, *O&M: Asphalt Crack Repair*.

G2020 PARKING LOTS

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 neatly to denote traffic lanes and parking spaces; mark in accordance with the requirements of UFC 3-200-10N, *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

Sidewalks shall be portland cement concrete pavement, 4 inches (100 mm) thick minimum. Provide concrete in accordance with the applicable standard mix of the SHS for a minimum compressive strength at 28 days of 3500 psi (25 MPa) concrete. Sidewalks shall be at least 5 feet (1.5 meters) wide, except that sidewalks connecting entry points of housing units to the housing unit's parking shall be at least 36 inches (900 mm) wide. Use the maximum percentage of fly ash allowed in the applicable standard mix of the SHS. 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.

Provide a broomed finish. 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).

G203003 1.1.1 Joints

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 portland cement concrete pavement with a minimum compressive strength at 28 days of 3500 psi (25 MPa) and 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

Aluminum fabric, posts or accessories shall not be used.

Chain link fence fabric shall be at least 9 gauge (3 mm) steel wire mesh material (before any coating) with mesh openings not larger than 2 inches (51 mm). Install fence in accordance with ASTM F 567 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. Each gate, terminal and end post will be braced 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 3-200-10N, *Civil Engineering*, 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. All posts and structural supports shall be located on the inner side of the fencing. Outriggers shall be installed facing outward except when the fence must be 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.

G204001 1.4 OPENINGS IN PERIMETER AND SECURITY FENCING

Openings in perimeter fencing and security fencing shall not be covered, blocked or laced with material which would prevent a clear view of personnel, vehicles or material in the outer or inner vicinity of the fenceline.

G204001 1.5 FENCE GROUNDING

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 shall also be 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 any 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. All site furnishings shall be permanently attached to concrete pads. Site furnishings shall conform to 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

Picnic areas shall include tables, with attached benches, on concrete bases sloped to drain and permanent barbecue grill(s). Additionally, separate receptacles shall be provided for trash, recycling and barbecue ashes. All site furnishings shall be permanently attached to concrete paving which shall extend a minimum of 12 inches (300 mm) past the furnishing, with the exception of picnic tables and benches, which shall extend 2 feet (600mm) minimum on all sides. The elevation of the finished concrete shall be plus 1 inch (25 mm) above adjacent grade.

G204003 1.2 TRASH RECEPTACLES

Trash receptacles, with drain hole, shall have stationary or self-closing lids with anchor chains secured to the receptacle to protect the contents from weather. Receptacles shall be designed to hold heavy-duty plastic or galvanized steel liners of the same manufacturer. Consideration shall be given to potential weight of full containers when deciding on 'top loading' or 'side loading' receptacles. Trash receptacles shall include a concrete pad 12 inches (300 mm) larger on all sides than the size of the trash receptacles.

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.

G204003 1.4 RECYCLING RECEPTACLES

Single-piece with separate slots for cans, bottles, newspaper. Height, material, and style shall match 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 MIL-HDBK-1013/14, *Selection and Application of Vehicle Barriers*.

G204005 SIGNAGE

Provide facility signage as required by 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 F 1487. Tot-Lots and Play-Lots shall be bordered with reinforced concrete curbing to a depth appropriate to the type safety surfacing utilized. Provisions for shade and wind protection shall be made where these elements may significantly limit the use of the facilities. Tot-lots and play-lots shall have separated areas with appropriately sized equipment and materials to serve their developmental levels. The areas shall be separated by a buffer zone, which can be an area of shrubs, hardscape or benches. Tot-lots and play-lots shall have 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 may include, as a minimum:

Multi-activity structures shall have a minimum of two platforms and two slides, one wheel chair accessible, swing set for young children, paired spring mounted 'riders' or other similar types of

apparatus. At least two benches, with backs, on concrete bases, shall be located 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 which provide a wider range of activities and opportunities for greater motor skills development and improvement. These may include, as a minimum:

Multi-activity structure shall have a minimum of three platforms and two slides, one wheel chair accessible. A swing set, or other similar types of apparatus. At least two benches, with backs, on concrete bases, shall be located for convenience to, and observation of, the play-lot.

G204007 1.1.3 Equipment

Tot lot and play lot equipment shall be factory finished institutional quality, in compliance with ASTM F1487, the United States Consumer Products Safety Commission's *Guidelines for Public Playgrounds*, UFC 3-210-04, *Design: Children's Outdoor Play Areas*, and the UFC 3-200-10N, *Civil Engineering*. Use only equipment that has been approved by IPEMA and installed by a NPCA contractor.

Tot lot and play lot equipment shall be sited 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. All use zones for play equipment shall be shown 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 will vary according to the types of adjacent equipment, and their orientation to one another.

G204007 1.1.4 CCA-Treated Lumber

CCA-treated lumber shall not be used in recreational facilities for children.

G204007 1.1.5 Playground Safety Surface

A playground safety surface, in accordance with ASTM F355 and ASTM F1292, shall be provided throughout all use zones and under all play equipment in tot lots and play lots. Natural wood products are not allowed for surfacing. Loose fill surfacing shall be a minimum of 4 inches (100 mm) below the top of edging. Local climate, soil conditions, location and size of area, type of activity, age of users, and intensity of use shall be considered when choosing surfacing material. Provide soil separator fabric between playground loose-fill material and subgrade soil. Provide 4 inch perforated pipe around perimeter of playground and slope to drain. 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.

G204090 OTHER SITE IMPROVEMENTS

Other site improvements shall conform to the BEAP or Installation Appearance Plan (whichever is applicable) and to the requirements of UFC 4-010-01.

G204090 1.1 DUMPSTER PADS AND ENCLOSURES

G2050 LANDSCAPING

G2050 1.1 DESIGN

The design of landscaped areas shall be 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. All non-paved site areas inside the project limits or outside the project limits disturbed by construction operations, after meeting plant quantity requirements, shall be covered with plant material or inorganic mulch. Stabilized soil or organic mulch is not acceptable as a ground cover. For NAVFAC Southwest projects, eliminate or minimize the use of turf, except when needed for active or passive recreation. Provide landscape architectural work in accordance with UFC 3-201-02, *Landscape Architecture*. All projects with planting and or irrigation areas shall utilize the design services of a Landscape Architect licensed in the state of the project. The Landscape Architect of Record shall 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.

G205001 FINE GRADING AND SOIL PREPARATION

See Section G10, Site Preparation.

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

Areas that are to be seeded that are larger than 1,000 square feet (92.90 square meters) shall be hydroseeded. Hydroseed mix composition shall be 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 shall 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. The Contractor shall tag trees to be saved with plastic or vinyl tape tied to the tree caliper. The Contractor shall protect existing trees by fencing planting areas to remain from compaction and any 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. The Contractor shall not allow debris from tree or stump removal operations to fall on or otherwise damage plants that are not scheduled for removal. Plastic tape and barrier fencing shall not be removed until planting operations are ready to begin and or instructed by the Contracting Officer. 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 shall be replaced with healthy plants of the same species or variety during the appropriate planting season. During the landscape establishment period, trees, turf, shrubs, and ground cover that are damaged or destroyed during construction operations shall be replaced by the Contractor at no additional cost to the Government. The Contractor, at the direction of the Contracting Officer, shall 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. Minimum caliper of replacement trees shall be 4 inch (100 mm). 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

Trees shall not be placed within 10 feet (3 meter) of any above or below-grade utility line or structure. Within roadway sightlines, mature shrubs shall not be greater than 3 feet (1 m) in height and trees shall be limbed up a minimum of 6 feet (2 m) so their mature growth will not obstruct views from vehicle intersections or points of vehicle ingress or egress.

G205005 1.3 RECYCLING

Green waste: Contact the Public Works Department for potential green waste collection and hauling by the Government. Green waste not collected by the Government shall be separated from construction debris and delivered 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 rate of one (1) tree per 1,000 square feet (92.9 square meters) of Landscape Area. Landscape area is defined as all permeable areas within the project boundaries not covered by buildings, roads, parking lots, sidewalks, and other non-permeable areas. Total minimum quantities may be reduced only by the reviewing government landscape archtect. For bioretention areas, minimum quantities of trees, shrubs, and ground covers shall be as required by 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 NAVFAC Southwest only: A minimum of forty percent (40%) of the landscaped areas shall be planted with shrubs and groundcover so that at 50 percent (50%) plant maturity, they will form mass plantings. Utilize a minimum ratio of 60 percent (60%) 5 gallon (18.9 liter) shrubs or groundcover and 40 percent (40%) 1 gallon (3.79 liter) shrubs or groundcover. The remaining sixty percent (60%) of the landscape area may be inorganic mulch, decomposed granite, planted or a combination. 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. For decomposed granite, provide 2 inch (50 mm) minimum depth. Do not use decomposed granite as a ground cover on slopes 5:1 and greater.

For all other NAVFAC Regions: 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 should be 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

All plants shall comply with ANSI Z60.1 and ANSI Z133.1, current editions. All plants shall be in a healthy, disease and pest free condition. All seed, sod, and sprigs shall be State Certified.

G205005 1.4.3 Plant Selection

The reviewing Government Landscape Architect shall have final approval authority on all selected plant material. Species deemed unsuitable for planting by the Government Landscape Architect will not be allowed.

G205005 1.4.4 Plant Installation

Planting operations, including but not limited to planting soil mixes and fertilization, shall comply with local established practices and agricultural extension service recommendations. Stake or guy new or transplanted trees with three stakes [2 - 2 Â½ inch(63.5 mm) x 8 feet (2.4 m) hardwood], or three guy cables [five-strand, 3/16 inch (5 mm) diameter galvanized steel cable].

G205005 1.4.5 Edging Materials and Mulching Materials

Provide 3/16 inch (5 mm) thick by 4 inch (100 mm) deep galvanized steel or 6 inch (150 mm) by 6 inch (150 mm) concrete edging dividing all turf and shrub areas and dividing all planted and non-planted inorganic mulch areas. Plastic edging is not allowed. Mulch planted areas not mulched with inorganic mulch or stabilized decomposed granite with a 3-inch (75 mm) depth of organic shredded hardwood mulch during the Establishment Period while plants are growing to form a mass.

G205005 1.4.6 Fertilizer

Fertilize all 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 all planted or mulched non-planted areas. Fabric shall be treated for protection against deterioration due to ultraviolet radiation. Fabric shall be 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 shall 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 all sloped areas 3:1 and greater in slope.

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 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. Verify adequate water pressure for irrigation purposes and provide booster pumps and or pressure regulation as required. Provide minimum 12 inch (300 mm) cover over PVC irrigation pipe. 1/2-inch (13mm) pipe is not allowed. The Landscape Contractor shall test the entire system in the presence of the Contracting Officer and Landscape Architect-of-Record to ensure proper performance. All irrigation components shall be commercial or institutional quality. Provide rain shut-off device and watertight splices. Sprinkler heads, bodies and nozzles shall be of the same manufacturer.

G205007 1.2 OPERATION AND CONTROL

Assure systems will automatically operate on an "irrigation window" between 2130-0530. 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 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 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. Irrigation systems intended to remain in place longer than one year shall be installed 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 shall 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. The chart shall be affixed to the inside of the controller cabinet door using approved mastic or fastening system.

-- End of Section --

SECTION G30

SITE CIVIL/MECHANICAL UTILITIES
4/08

G30 GENERAL

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*.

G30 1.1.1 Industry Standards and Codes

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

G30 1.1.2 Government Standards

UNIFIED FACILITY CRITERIA (UFC)

UFC 1-300-09N, *Design Procedures*

UFC 3-200-10N, *Civil Engineering*

UFC 3-400-10N, *Mechanical Engineering*

UFC 3-800-10N, *Environmental Engineering for Facility Construction*

G30 1.2 QUALITY ASSURANCE

Materials and assemblies installed in the work shall 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 shall be removed, or corrective measures taken, to assure compliance with the referenced standard. The Contractor shall perform field tests and provide labor, equipment and incidentals required for testing.

G30 1.2.1 Materials

All materials shall be new, and shall bear the label of standardizing agency whenever standards have been established and label service is normally and regularly furnished by the agency. All equipment provided shall be listed and labeled suitable 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 shall be certified by the state and shall remain certified while constructing the well.

G30 1.2.4 Qualifications of Coating Contractors for Water Storage Tanks

All contractors and subcontractors that perform surface preparation or coating application shall 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 shall remain certified while accomplishing any surface preparation or coating application.

G30 1.2.5 Qualifications of Oil/Water Separator Manufacturers

Manufacturers shall have produced packaged oil/water separate units of similar size required for over five years.

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 Section 01 33 10.05 20, *Design Submittal Procedures*, and Section 01 33 00.05 20, *Construction Submittal Procedures*, for additional requirements.

Verification of satisfactory utility system performance shall be via Performance Verification Testing, as detailed in this section of the RFP. Verification of satisfactory performance shall also be via testing as detailed in the paragraph, "Field Quality Control", in applicable 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 and water quality testing in accordance with AWWA A100 and its appendices and the state waterworks' 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.

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 Water Booster Pump Station Verification Testing

Test the water booster pump station in accordance with the state waterworks' 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 all equipment.

G30 1.3.4 Sanitary Sewer Distribution System Verification Testing

Provide testing on sewer mains and laterals in accordance with the state sewerage regulations.

G30 1.3.4.1 Visual Test

Check each straight run of pipeline for gross deficiencies by holding a light in a manhole; it shall show a practically full circle of light through the pipeline when viewed from the adjoining end of line.

G30 1.3.4.2 Leakage Tests

G30 1.3.5 Sanitary Sewer Manholes Verification Testing

Provide testing on sanitary sewer manholes in accordance with the state sewerage regulations. At minimum, perform hydraulic testing in accordance with ASTM C 969M (ASTM C 969).

G30 1.3.6 Wastewater Pump Station Verification Testing

Test the wastewater pump station in accordance with the state sewerage 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 all equipment.

G30 1.3.7 Storm Sewer System Verification Testing

G30 1.3.7.1 Visual Test

Check each straight run of pipeline for deficiencies by holding a light in a manhole; it shall show a full circle of light through the pipeline when viewed from the adjoining end of line.

G30 1.3.7.2 Leakage Tests for Storm Sewer Under Pavements

Test lines for leakage by either infiltration tests or exfiltration tests, or by low-pressure air tests in accordance with the following:

a. Exfiltration Tests:

ASTM C 969M (ASTM C 969) and perform calculations in accordance with its Appendix.

b. Low-pressure Air Tests:

1) Pipelines: ASTM C 924M (ASTM C 924) and perform calculations in accordance with its Appendix.

2) PVC plastic pipelines: UBPPA UNI-B-6 and perform calculations in accordance with its Appendix.

G30 1.4 DESIGN SUBMITTALS

Design Submittals shall be in accordance with UFGS section 01 33 10.05 20, *Design Submittal Procedures*, UFC 1-300-09N, *Design Procedures*, UFC 3-200-10N, *Civil Engineering*, and UFC 3-400-10N, *Mechanical Engineering*.

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) shall approve the following construction submittals as a minimum:

All test reports.

G30 1.6 COORDINATION

To the extent that site work is indicated on the RFP drawings, the Contractor shall verify that the locations and inverts of all site utility lines are coordinated with building utility lines. If necessary, the Contractor shall make adjustments to the locations and inverts indicated on the RFP drawings in accordance with applicable 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

The Contractor shall submit backflow prevention training certificates and backflow preventer devices certification in accordance with Section 01 50 00.05 20 (01501N), *Temporary Facilities and Controls for Design-Build*.

G30 1.9 WATER STORAGE TANK

The Contractor shall 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 as applicable.

G30 1.10 NACE CERTIFIED CATHODIC PROTECTION SPECIALIST QUALIFICATIONS

Submit prior to site welding. Certifications shall not be more than one year old. Submit documentation of 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

The Contractor shall determine domestic and fire demands for the facility and shall verify the design of all components of the domestic and fire protection supply systems. The water system design and construction shall be in accordance with UFC 3-200-10N, *Civil Engineering*, 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, the Contractor shall obtain all necessary static pressure, residual pressure and flow characteristics of the existing distribution system by actual field tests. The Contractor shall conduct flow and pressure tests and provide design calculations that show the existing lines are capable of handling the additional flows. The new water system shall connect to the nearest existing fitting or water line.

The Contractor shall design the connections to the water system including the necessary meter assemblies and backflow-preventing devices in accordance with the requirements of the Activity or utility provider and the state waterworks regulations.

Wherever possible, valve boxes and all other utility access structures shall be located out of paved areas.

G301001 WELL SYSTEMS

The potable water well system shall be designed and constructed 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/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 all 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 3-200-10N, *Civil Engineering*; the utility provider's requirements; and the state waterworks' regulations; whichever is more stringent.

Available flow at the residual pressure at each point of connection shall be determined by conducting flow tests in accordance with AWWA M17 and NFPA 291.

Water main piping, service lines, fittings, valves, accessories and all other materials shall meet 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, water mains 12 inches (300 mm) in diameter and less shall be ductile iron, PVC, or high density polyethylene (HDPE). Water mains deeper than 10 feet (3.0 m) or larger than 12 inches (300 mm) in diameter shall be ductile iron.

For aboveground applications, water mains shall be flanged ductile iron pipe.

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. HDPE Pressure Pipe: AWWA C906.

d. 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.
c. HDPE: applicable requirements of ASTM D 2774.

Provide a continuous length of tracer wire for the full length of each run of nonmetallic pipe.

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

Water service lines less than 4 inches (100 mm) in diameter shall be copper tubing, PVC, or polyethylene (PEX) tubing. Water service lines 4 inches (100 mm) and 6 inches (150 mm) in diameter shall be ductile iron pipe and PVC pressure pipe; 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 88M (ASTM B 88), 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.

c. Polyethylene Tubing: AWWA C901.

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-B-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: applicable requirements of AWWA C600.
b. PVC: applicable requirements of ASTM D 2774 and ASTM D 2855.
c. Polyethylene: applicable requirements of ASTM D 2774 and ASTM F 645.

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, service lines of dissimilar metal to the water mains and the attendant corporation stops shall be wrapped with polyethylene or suitable dielectric tape for a minimum clear distance of 3 feet (900 mm) from the main.

G301002 1.5 VALVES

Valves shall be the same diameter and have the same joint ends as the mains to which they are installed. Each type of valve shall be of one manufacturer.

G301002 1.5.1 Gate Valves

G301002 1.5.1.1 Location

Valves shall be installed at all new points of connection. At a minimum, valves shall be located 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. Valves shall be located 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 C500 with indicator post flange in accordance with applicable 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. Valves shall have 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. Valve boxes shall be 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

Valves sized 2-inches (50 mm) to 24-inches (600 mm) shall be swing-check type (AWWA C508) and have 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. The corporation stops shall be ground key type, bronze, 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

Fire hydrants shall all be of one manufacturer. Provide protection for fire hydrants located in areas subject to vehicle damage. Fire hydrants shall have 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. 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.

a. Concrete Thrust Blocks: AWWA C600.
b. Restrained Joints: Pipe manufacturer's recommendations and required length of pipe to be restrained calculated in accordance with UFC 3-200-10N, *Civil Engineering*.

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 3-200-10N, *Civil Engineering*, and the state waterworks' regulations.

An elevated, steel water storage tank shall be in accordance with AWWA D100. A ground, steel water storage tank shall be in accordance with AWWA D100 for welded tanks and AWWA D103 for bolted tanks.

G301003 1.2 TANK ACCESSORIES

Piping and valves shall be in accordance with G301002. An altitude valve shall be installed in a valve vault with appropriate shut off valves and check valve.

G301003 1.3 TANK COATINGS

G301003 1.3.1 Interior Coating System

Provide interior coating system complying with NSF 61 and the state waterworks' regulations.

G301003 1.3.2 Exterior Coating System

Primer coat shall be epoxy polyamide, MIL-DTL-24441/19 (Formula 159, Type III). Intermediate coat shall be epoxy polyamide, MIL-DTL-24441/31 (Formula 152, Type IV, White (Tinted)). Tint to approximately FED-STD-595 color number 27778 parchment using pigment dispersions prepared for epoxy paint tinting. Manufacturer shall tint material and appropriately label. All other requirements of this Military Specification apply.

Provide polyurethane coating topcoat of MIL-PRF-85285, Type II, Beige FED-STD-595 color number 27769 in gloss. The color of the final coat shall be approved in writing by the Contracting Officer before application begins.

G301004 FIRE PROTECTION WATER DISTRIBUTION

G301004 1.1 GENERAL REQUIREMENTS

Refer to applicable portions of Section G301002 and Section D40, *Fire Protection Systems*. Water main piping, service lines, fittings, valves, accessories and all other materials shall meet 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 shall include 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

Refer to G301003.

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 3-200-10N, *Civil Engineering*, and the state waterworks' regulations.

The packaged booster pump station shall have an Underwriter’s Laboratories (UL) label indicating compliance of the equipment under the packaged pumping systems UL listing category. This label shall 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.

All interior coatings of pumps, piping, valves and other accessories shall 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 3-200-10N, *Civil Engineering*, for pipeline materials and the state waterworks' regulations for treatment plant requirements.

G3020 SANITARY SEWER

G3020 1.1 GENERAL REQUIREMENTS

The gravity sanitary sewage collection system shall be designed and constructed in accordance with UFC 3-200-10N, *Civil Engineering*, and the

state sewer collection and treatment regulations. The new sanitary sewage collection system shall connect to the nearest existing sanitary manholes and/or sanitary lines adjacent to the project site. The Contractor shall 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), it is recommended that the floor drains be eliminated or provisions made 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, manholes and all other utility access structures shall be located out of paved areas.

G302001 SANITARY SEWER PIPING

G302001 1.1 GENERAL REQUIREMENTS

Provide all materials, equipment, labor, testing, and miscellaneous related items to provide sanitary sewage lines necessary for distribution and services to the buildings.

G302001 1.2 GRAVITY SEWER PIPING

Gravity sewer mains and laterals shall be PVC sewer pipe and fittings, except under roadways or at depths greater than 10 feet (3.0 m) where ductile iron pipe shall be provided.

G302001 1.2.1 Materials

a. PVC Gravity Sewer Pipe

1) Piping and Fittings: ASTM D 3034, SDR 35.

2) Joints: ASTM D 3212 and ASTM F 477.

b. Ductile Iron Gravity Sewer Pipe

1) Piping: ASTM A 746. Provide required Thickness Class based on design information and methods in ASTM A 746.

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.

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: ASTM D 2321. Do not use ASTM D 2321 Class IV or V materials for bedding, haunching or initial backfill materials.
b. Ductile Iron: AWWA C600.

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 all materials, equipment, labor, testing, and miscellaneous related items for the sanitary manholes in accordance with the following:

a. Manhole rim elevations shall 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 shall conform to ASTM C 923M (ASTM C 923).
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 478M (ASTM C 478); base and first riser shall be monolithic.

Precast manhole sections shall have:

a. ASTM C 990M (ASTM C 990) butyl gaskets;
b. ASTM C 443M (ASTM C 443) rubber O-ring joints; or
c. AASHTO M 198, Type B preformed plastic 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. Concrete work shall be in accordance with ACI 301M (ACI 301) and ACI 350-01; provide a minimum compressive strength of 4000 psi (28 MPa).

G302002 1.4 MANHOLE FRAMES AND COVERS

FS A-A-60005; cast iron or ductile iron; designed to accommodate the traffic loadings. The word "Sewer" shall be stamped or cast 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 443M (ASTM C 443), except shore A durometer hardness shall be 70 plus or minus 5.

Aluminum steps or rungs will not be permitted.

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 as necessary 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 permitted on interior manhole walls.

G302002 1.7 CONNECTIONS TO EXISTING MANHOLES

Pipe connections to existing manholes shall be centered on the manhole. Holes for the new pipe shall 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. Cutting the manhole shall be done in a manner that will cause 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 all materials, equipment, labor, testing and miscellaneous related items for a packaged lift or pump station system for the facility in compliance with the UFC 3-200-10N, *Civil Engineering*; the state sewerage regulations; and the utility provider's requirements.

G302003 1.2 SUBMERSIBLE PUMPS

Pumps handling raw wastewater shall be capable of passing spheres of at least 3 inches (75 mm) in diameter. The pump's suction and discharge openings shall be at least 4 inches (100 mm) in diameter.

Provide submersible type sewage pumps, with guide rail system. Include ASTM A48M (ASTM A48), Class 25, nonclog, cast-iron impeller; and hermetically sealed motor with moisture-sensing probe, mechanical seals, and waterproof power cable. Guide rail system shall be constructed 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. Guide rail system shall be constructed of stainless steel. Provide a stainless steel lifting chain for raising and lowering the pump in the basin.

G302003 1.4 SUCTION LIFT PUMPS

Pumps handling raw wastewater shall be capable of passing spheres of at least 3 inches (75 mm) in diameter. The pump's suction and discharge openings shall 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 A48M (ASTM A48), Class 25, nonclog, cast iron impeller; mechanical or stuffing box seals; pedestal mounted motor; and suction piping extending to bottom of wet pit.

Suction-lift pumps shall be capable of automatic rapid self priming and re-priming at the "lead pump on" elevation. Suction piping shall not exceed 25 feet (7.6 meters) in total length. Priming lift at the “lead pump on” elevation shall 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 shall 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 shall be at least 4 inches (100 mm) in diameter and shall be 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.

2) Fittings: Ductile Iron (AWWA C110 or AWWA C153).

G302003 1.7.2 Force Mains for Grinder Pumps

Force mains less than 4 inches (100 mm) in diameter shall be PVC pressure pipe:

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 type of 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 applicable for sewage as indicated. Use flexible flanged coupling designed for a working pressure of 350 psi (2400 kPa).

G302003 1.9 VALVES

Suitable shutoff and check valves shall be provided 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 shall 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. Valves shall be 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, where required, 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.

a. Concrete Thrust Blocks: AWWA C600.
b. Restrained Joints: Pipe manufacturer's recommendations and required length of pipe to be restrained calculated in accordance with UFC 3-200-10N, *Civil Engineering*.

G302003 1.12 STATION CONTROL SYSTEM

G302003 1.12.1 Operating Controls

G302003 1.12.2 Alarm Controls

Provide alarms for all 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

Covered wet wells shall have provisions for air displacement venting to the outside. Galvanized ASTM A 53/A 53M pipe with insect screening.

Provide adequate ventilation for all pump stations.

G302003 1.14.2 Metering

Provide devices for measuring wastewater flow at all 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 3-200-10N, *Civil Engineering*, 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/WATER SEPARATOR

Refer to G303090.

G3030 STORM SEWER

Provide all materials, equipment, labor, testing, and miscellaneous related items to provide storm drainage collection system necessary to drain the site. The storm sewer collection system shall be designed and constructed in accordance with UFC 3-200-10N, *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 less than 12 inches (300 mm) in diameter shall be PVC or ductile iron. Storm sewer piping 12 inches (300 mm) and larger in diameter shall be reinforced concrete or corrugated steel; corrugated aluminum and HDPE pipe may only be used when written approval is received by the Government's Civil Reviewer or indicated in another part of the RFP.

Subsurface drainage piping shall be perforated PVC or HDPE.

G303001 1.1.1 Materials

a. PVC Pipe

1) Piping and Fittings: ASTM D 3034, SDR 35.

2) Joints: ASTM D 3212 and ASTM F 477.

b. Ductile Iron Pipe

1) Piping: ASTM A 746. Provide required Thickness Class based on design information and methods in ASTM A 746.

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 C 76M (ASTM C 76). Provide required Class based on design information and methods in ASTM C 76M (ASTM C 76). Class III minimum.

2) Elliptical Pipe: ASTM C 507M (ASTM C 507). Provide required Class based on design information and methods in ASTM C 76M (ASTM C 76).

3) Joints:

a) ASTM C 990M (ASTM C 990) butyl gaskets;

b) ASTM C 443M (ASTM C 443) rubber O-ring joints; or

c) AASHTO M 198, Type B preformed plastic gaskets.

d. Corrugated Aluminum Pipe

1) Piping: ASTM B 745.

2) Joints: Coupling bands conforming to ASTM B 745.

3) Coating: Fully bituminous coated for all applications in accordance with ASTM A 849. For applications where piping is part of a piped storm sewer system (not a culvert), pipe shall be fully bituminous coated, invert (half) paved with concrete lining in accordance with ASTM A 849.

e. Corrugated Steel Pipe

1) Piping: ASTM A 760.

2) Joints: Coupling bands conforming to ASTM A 760.

3) Coating: Fully bituminous coated for all applications in accordance with ASTM A 849. For applications where piping is part of a piped storm sewer system (not a culvert), pipe shall be fully bituminous coated, invert (half) paved with concrete lining in accordance with ASTM A 849.

f. HDPE

1) Piping: AASHTO M 294 Type S, corrugated.

2) Joints: Soiltight.

g. Perforated PVC Pipe: ASTM D 2729.

h. Perforated HDPE Pipe

1) Piping and Fittings: AASHTO M 252, Type S, corrugated.

2) Joints: Soiltight.

G303001 1.1.2 Installation

Install piping in accordance with manufacturer's recommendations.

a. PVC: ASTM D 2321. Do not use ASTM D 2321 Class IV or V materials for bedding, haunching or initial backfill materials.
b. Ductile Iron: AWWA C600.
c. Reinforced Concrete: ACPA 01-102 and 01-103.
d. Corrugated Aluminum: ASTM B 788.
e. Corrugated Steel: ASTM A 798.
f. HDPE: CPPA 100.
g. Perforated PVC and Perforated HDPE: ASTM D 2321. Do not use ASTM D 2321 Class IV or V materials for bedding, haunching or initial backfill materials.

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-type 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 all materials, equipment, labor, testing, and miscellaneous related items for the drainage structures in accordance with the following:

a. Structure rim elevations shall 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 shall conform to ASTM C 923M (ASTM C 923).
c. Provide precast or cast-in-place concrete drainage structures, except cast-in-place concrete is required for airfield drainage structures, headwalls and gutters.

G303002 1.2 PRECAST CONCRETE INLETS

Provide work and materials in accordance with applicable 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.

For airfield drainage structures, provide work and materials in accordance with FAA ACA 150/5370-10B.

G303002 1.4 DRAINAGE STRUCTURE FRAMES AND COVERS

FS A-A-60005; cast iron or ductile iron; designed to accommodate the traffic loadings. The word "Storm" shall be stamped or cast into covers so that it is plainly visible.

For airfield drainage structures, fabricate frames and covers of standard commercial grade steel welded by qualified welders in accordance with AWS D1.1/D1.1M. Covers shall be of rolled steel floor plate having an approved anti-slip surface. Steel frames and covers shall be hot dipped galvanized after fabrication. At the contractor's option, ductile iron covers and frames may be used for airfield drainage structures if designed for a minimum proof load of 100,000 pounds (45,000 kg) in lieu of the steel frames and covers. Covers shall be of the same material as the frames (i.e. ductile iron frame with ductile iron cover, galvanized steel frame with galvanized steel cover). Proof loading shall be performed in accordance with FS A-A-60005 and ASTM A 48/A 48M. Proof loads shall be physically stamped into the cover. Provide the Contracting Officer copies of previous proof load test results performed on the same frames and covers as proposed for this contract. The top of the structure shall be modified to accept the ductile iron structure in lieu of the steel structure indicated. The finished structure shall 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 443M (ASTM C 443), except shore A durometer hardness shall be 70 plus or minus 5.

Aluminum steps or rungs will not be permitted.

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 as necessary 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

Pipe connections to existing structures shall be centered on the structure. Holes for the new pipe shall 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. Cutting the structure shall be done in a manner that will cause 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

Culverts less than 12 inches (300 mm) in diameter shall be PVC or ductile iron. Culverts 12 inches (300 mm) and larger in diameter shall be reinforced concrete or corrugated steel; corrugated aluminum and HDPE pipe may only be used when written approval is received by the Government's Civil Reviewer or indicated in another part of the RFP.

Flared end sections shall the same material as pipe material.

Provide erosion control riprap in accordance with the State Highway Specifications (SHS) and standards where the project is located.

See G303001, paragraphs 1.1.1 and 1.1.2 for material and installation requirements.

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 detention/retention ponds and other drainage features to regulate stormwater runoff and to prevent damage to the site and off-site. Integrate permanent stormwater management ponds, swales, and other stormwater management features, into the total site design to provide an aesthetically pleasing and harmonious landscape. Develop and construct the ponds and other drainage features in accordance with UFC 3-200-10N, *Civil Engineering*, and the state stormwater management Laws and Regulations.

G303090 OTHER STORM SEWER

G303090 1.1 OIL/WATER SEPARATOR

Provide an oil/water separator to remove free oil from oil-in-water mixtures originating from proposed facility operations. Provide grit protection upstream of the oil/water separator.

The oil/water separator shall utilize coalescing media and conform to the applicable guidelines of the American Petroleum Institute (API).

Provide materials or a coating system which will protect the separator from the oil-in-water mixture, atmosphere, and in-situ soil conditions.

Use a separator with a completely removable cover.

G3040 HEATING DISTRIBUTION

G304001 OVERHEAD HOT WATER SYSTEMS

G304001 1.1 PIPING & FITTINGS

Hot water piping shall 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 shall 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 type 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

Steam piping shall 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. 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

Condensate piping shall 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.

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 shall 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 type 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 shall 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 will not be allowed.

G304003 1.2 INSULATION

The minimum insulation thickness shall 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 UHDS representative shall 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 shall include verification information.

G304003 1.4 VALVING

Provide isolation valves on supply and return lines at take-offs for service to each building. Valves shall be located in valve boxes. Valves shall 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 shall 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 will not be allowed.

G304004 1.2 INSULATION

The minimum insulation thickness shall 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 shall 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 shall include verification information.

G304004 1.4 VALVING

Provide isolation valves on supply and return lines at take-offs for service to each building. Valves shall be located in manholes. Valves shall 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 shall be shall be constructed of reinforced, 3000 psi (206.8 bar) concrete and shall extend a minimum of 6 inches (300 mm) above grade. Depth shall 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 ladder. Ladder shall be steel with non-slip surfaces and anchored to the wall. Manhole floor and walls shall 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.

G304090 1.2 CORROSION PROTECTION

Provide a cathodic protection system for the underground piping system. System shall be designed by a National Association of Corrosion Engineers (NACE) certified Cathodic Protection Engineer. The corrosion engineer shall obtain soil data and existing system conditions. Corrosion engineer shall supervise, inspect and test the installation and performance of the cathodic protection system. Test stations shall be post mounted and placed at the manhole or nearby building. Test stations shall 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 shall 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 shall 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 type expansion joints.

G305002 UNDERGROUND COOLING SYSTEMS

G305002 1.1 PIPING & FITTINGS

Direct buried, factory-prefabricated, pre-insulated, chilled water piping systems. All fittings and accessories shall be designed and factory-fabricated to prevent moisture from entering into the system. Backfill and overall installation shall 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. Valves shall be located 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.

G305090 1.3 CORROSION PROTECTION

Provide a cathodic protection system for the underground chilled water and condenser water piping system. System shall be designed by a National Association of Corrosion Engineers (NACE) certified Cathodic Protection Engineer. The corrosion engineer shall obtain soil data and existing system conditions. Corrosion engineer shall supervise, inspect and test the installation and performance of the cathodic protection system. Test stations shall be post mounted and placed at the manhole or nearby building. Test stations shall be located at each end of each cathodically protected section.

G3060 FUEL DISTRIBUTION

G306001 LIQUID FUEL DISTRIBUTION PIPING

G306001 1.1 GASOLINE/DIESEL

Fuel piping shall be ASTM A 53, Type E (electric-resistance welded, Grade A or B) or Type S (seamless, Grade A or B), black steel or API SPEC 5L, seamless, submerged-arc weld or gas metal-arc weld, Grade B, black steel. Provide Weight Class STD (Standard) for welding end connections. Provide Weight Class XS (Extra Strong) for threaded end connections.

G306003 LIQUID FUEL STORAGE TANKS

G306003 1.1 STORAGE TANKS

Aboveground, concrete encased or double wall in accordance with UL 142 and UL 2085 with secondary containment and leak monitoring with a capacity to meet the system requirements. Provide with overfill/spill containment, overfill protection and vents.

G306003 1.2 FUEL PUMPS

Fuel pumps shall comply with NEMA MG 1, NFPA 70, and be designed for use with hydrocarbon fuels and working pressure of 275 psig (1896 kilopascals) at 100 degrees F (38 degrees C).

G306003 1.3 FUEL METERS

Continuous duty, positive displacement type, with electronic thermal compensation capability, suitable for outdoor installation, and designed for use with hydrocarbon fuels and working pressure of 275 psig (1896 kilopascals) at 100 degrees F (38 degrees C).

G306004 LIQUID FUEL DISPENSING TANKS

The same as storage tanks except, include tank mounted dispenser with filter, vacuum breaker, safety breakaway, hose and nozzle.

G306006 GAS DISTRIBUTION PIPING (NATURAL & PROPANE)

G306006 1.1 STEEL PIPE

Gas piping shall 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 shall 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.

-- End of Section --

SECTION G40

SITE ELECTRICAL UTILITIES
03/10

G40 GENERAL

G40 1.1 NARRATIVE

This section covers installations exterior to the facility up to the five foot line. See PTS Section D50, *Electrical*, for continuation of systems into 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 additional verbiage. One example of this is G401008, GROUNDING SYSTEMS.

G40 1.2.1 Government Standards

UNITED FACILITIES CRITERIA (UFC)

UFC 3-501-01, *Electrical Engineering*

UFC 3-570-02N, *Electrical Engineering Cathodic Protection*

UNIFIED FACILITIES GUIDE SPECIFICATIONS (UFGS)

UFGS 26 12 19.10, *Three-Phase Pad-Mounted Transformers*

UFGS 26 23 00, *Switchboards and Switchgear*

UFGS 33 71 01.00 20, *Overhead Transmission and Distribution*

UFGS 33 71 02, Underground Electrical Distribution

UFGS 33 82 00, Telecommunications outside Plant (OSP)

G40 1.3 QUALITY ASSURANCE

Qualifications, certifications, and Test Plans indicated herein shall be submitted 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

Contractor shall 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 shall be independent of the supplier, manufacturer, and installer of the equipment. The organization shall be a first tier subcontractor.

a. Submit name and qualifications of organization. Organization shall have been regularly engaged in the testing of electrical materials, devices, installations, and systems for a minimum of 5 years. The organization shall have a calibration program, and test instruments used shall 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 shall 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 shall be 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 shall 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)

Certification shall include the training, and experience of the individual on the specific type and classification of medium voltage cable to be provided under this contract.

In order to establish the cable splicer's competency, the Contractor shall be required to submit the following 30 calendar days prior to commencement of the splice/termination:

a. Documentation to verify that the individual has completed a splice and or termination of the type to be installed under this contract.
b. Documentation that said splice/termination has been tested and passed in accordance with NETA ATS requirements. Test results shall be included.
c. A statement of the number of years in which the individual has been splicing/terminating medium voltage cable.

G40 1.3.5 Qualified Cable Splicer (Telecommunications)

Certification shall include the training, and experience of the individual on specific type and classification of telecommunications cable to be provided under this contract.

G40 1.3.6 Qualified Cable Installer and Splicer (Fiber Optic Cable)

Certification shall include the training, and experience of the individual on specific type and classification of Fiber Optic media to be provided under this contract.

G40 1.3.7 Qualified Fiber Optic (FO) Cable Manufacturer

The FO media manufacturer shall 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 shall provide a list of customers with 3 years of maintenance logs documenting experience with government customers.

G40 1.3.8 Material Standards

Ensure service support and provide manufacturer's nameplate in accordance with PTS Section Z10, *General Performance Technical Specification*.

G40 1.3.8.1 Warning Labels

Each enclosure of electrical equipment, including substations, pad-mounted transformers, pad-mounted switches, pad-mounted sectionalizing termination cabinets, and switchgear, shall have a warning label identifying the enclosure as 1) containing energized electrical equipment and 2) an arc flash hazard.

G40 1.3.9 Factory Testing

The Government reserves the right to witness all factory testing. The manufacturer shall have a calibration program that assures that all applicable test instruments are maintained within rated accuracy.

G40 1.3.10 Electrical System Startup and Testing

Submit test plans for approval. The test plans shall be tailored to the systems provided.

The test plan shall list make and model and provide functional description of the test instruments and accessories and shall describe the setup of the tests to be conducted. Test instruments shall 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 1.3.10.1 Factory Trained Engineer

Provide a factory trained engineer to supervise start-up and testing as required in referenced specifications.

G40 1.3.10.2 Performance Verification Testing

The Contractor shall show by demonstration in service that all circuits and devices are in operating condition. Tests shall be such that each item of control equipment will function not less than five times. The Contractor shall provide all necessary test equipment, tools, fuel, load banks, labor, and materials for testing. As a minimum, all systems shall be tested in accordance with manufacturer's recommendations. Additional testing requirements for the various systems are described with those systems, hereinafter. The Contractor shall assure that all applicable test instruments are maintained within rated accuracy. Dated calibration labels shall 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 shall 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 1.3.10.3 Acceptance Tests and Inspections

The Qualified Testing Organization shall provide the Acceptance Tests and Inspections test plan and procedures and perform the acceptance tests and inspections. Test methods, procedures, and test values shall 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. Equipment shall be placed in service only after completion of required tests and evaluation of the test results have been completed. Contractor shall 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

Design Submittals shall be in accordance with PTS Section Z10, *General Performance Technical Specifications*, UFGS Section 01 33 10.05 20, *Design Submittal Procedures*, UFC 1-300-09N, *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 11 13.00 20, *Primary Unit Substation*

UFGS 26 11 16, *Secondary Unit Substations*

UFGS 26 12 19.10, *Three-Phase Pad-Mounted Transformers*

UFGS 26 13 00.00 20, *SF6 Insulated Pad-Mounted Switch Gear*

UFGS 26 23 00, *Switchboards and Switchgear*

UFGS 33 71 01.00 20, *Overhead Transmission and Distribution*

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) shall 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 in Government Surveillance UFGS 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.

G4010 ELECTRICAL DISTRIBUTION

G401001 SUBSTATIONS

When secondary unit substations are required, the Designer of Record shall utilize UFGS Section 26 11 16, *Secondary Unit Substation*, and UFGS Section 26 23 00, *Switchboards and Switchgear*, for the project specification, and shall submit the edited specification section as a part of the design submittal for the project.

G401002 TRANSFORMERS

When transformers are required, the Designer of Record shall utilize UFGS Section 26 12 19.10, *Three-Phase Pad Mounted Transformers*, UFGS Section 26 12

19.20, *Single-Phase Pad Mounted Transformers*, or UFGS Section 33 71 01.00 20, *Overhead Transmission and Distribution*, for the project specification, and shall submit the edited specification section as a part of the design submittal for the project.

G401004 OVERHEAD ELECTRIC CONDUCTORS

Power line conductors shall be strung in accordance with manufacturer's standard sag and tension recommendations.

G401005 TOWERS, POLES, CROSSARMS AND INSULATORS

Wood poles shall 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 shall 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 shall comply with ANSI loadings for distribution poles.

The size of poles required, class, height and other data, shall be determined by the designer of record to meet requirements of the pole line. Crossarms shall be wood, steel or fiberglass in accordance with industry and local standards. Insulators, cutouts and associated equipment shall be determined by the Designer of Record to meet system requirements.

G401006 UNDERGROUND ELECTRIC CONDUCTORS

Route underground cables to minimize splices. Cable pulling tensions shall not exceed the maximum pulling tension recommended by the cable manufacturer. Medium voltage cable termination shall be suitable for the location installed and meet IEEE Std. 48 Class 1 requirements.

G401007 DUCTBANKS, MANHOLES, HANDHOLES AND RACEWAYS

Concrete manholes and handholes shall be standard type pre-cast concrete. Composite/Fiberglass handholes shall be polymer concrete reinforced with a heavy weave fiberglass reinforcing as indicated. Load ratings of manholes and handholes shall be suitable for the location installed.

G401008 GROUNDING SYSTEMS

G401009 METERING

G401010 CATHODIC PROTECTION SYSTEMS

Cathodic protection systems shall be in accordance with UFC 3-570-02N.

G401011 EQUIPMENT REQUIREMENTS FOR COASTAL AND HIGH HUMIDITY AREAS

G4020 SITE LIGHTING

G402001 EXTERIOR LIGHTING FIXTURES AND CONTROLS

Maintained mean area lighting levels shall be 6 lux (0.5 fc). Lighting uniformity shall be maintained with the following average to minimum (avg/min) uniformity ratios:

a. Highway Lighting, 3:1
b. Secondary Street Lighting, 6:1
c. Residential Streets, 6:1

d. Area And Parking Lighting, 6:1

LED Fixture Description

LED fixture sides shall be rugged cast aluminum with integral, weather-tight LED driver compartments and high performance aluminum heatsinks. Mounting housing shall be rugged die cast aluminum and mounts to a 3-6’’ round pole. Fixture shall have a five year warranty.

Electrical

Modular design shall accommodate a varied lighting output from high power, white, 6000K (+/- 500K per full fixture), minimum 70 CRI, long life LED sources. LED drivers have power factor >90% and THD<20% of full load. Units shall be provided with integral 9kV surge suppression protection standard. An integral weather-tight electrical box with terminal strip for easy power hook-up shall be provided. Surge protection tested in accordance with IEEE C62.41.2 and ANSI standard 62.41.2.

Testing & Compliance

UL listed in the U.S. and Canada for wet locations. RoHS compliant. International Dark-Sky Association approved. Fixture and finish shall be endurance tested to withstand 5,000 hours of elevated ambient salt fog conditions as defined in ASTM Standard B 117.

G402002 SPECIAL SECURITY LIGHTING SYSTEM
G402003 OTHER AREA LIGHTING

G402004 LIGHTING POLES

Poles shall meet Uniform 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. Poles shall be direct set or anchor-base type designed for use with underground supply conductors.

G402005 UNDERGROUND ELECTRIC CONDUCTORS

Provide in accordance with Paragraph G401006.

G402006 DUCTBANKS, MANHOLES AND HANDHOLES

Handholes and underground conduits for site lighting shall be in accordance with Paragraph G401007.

G402007 GROUNDING SYSTEMS

G4030 SITE COMMUNICATION AND SECURITY

G403001 TELECOMMUNICATIONS SYSTEMS

G403002 CABLE TV SYSTEMS (CATV)

G403003 CABLES AND WIRING

G403004 DUCTBANKS, MANHOLES AND HANDHOLES

Provide in accordance with paragraph G401007.

G403005 TOWERS, POLES AND STANDS

Provide in accordance with paragraph G401005.

G403006 TV CAMERAS AND MONITORS

G403007 ELECTRONIC SECURITY SYSTEM (ESS)

G403008 OTHER COMMUNICATION AND ALARM

G403009 GROUNDING SYSTEMS

G4090 OTHER ELECTRICAL UTILITIES

--End of Section--

SECTION Z10

GENERAL PERFORMANCE TECHNICAL SPECIFICATION
03/10

Z10 GENERAL

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 UFGS 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.

The PTS Sections are general in nature and not all items listed in the PTS sections will be required for this project. Refer to RFP Part 3 - Project Program, including the ESRs for project specific requirements.

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 shall be mandatory; substitute words such as "shall", "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" shall be interpreted to mean "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) - with exceptions and additions noted in UFC 1-200-01

INTERNATIONAL MECHANICAL CODE (IMC)

INTERNATIONAL PLUMBING CODE (IPC)

NATIONAL FIRE CODES (NFC) - with exceptions and additions noted in UFC 1-200-01 and UFC 3-600-01

Z10 1.2.2 INDUSTRY REQUIREMENTS

WHOLE BUILDING DESIGN GUIDE (WBDG)

WHOLE BUILDING DESIGN GUIDE, Ensure Occupant Safety and Health (Systems Safety Engineering) at http://www.wbdg.org/design/ensure_health.php

Z10 1.2.3 GOVERNMENT STANDARDS

Z10 1.2.3.1 UNIFIED FACILITIES CRITERIA (UFC)

The UFC's required by this project are referenced in the contract documents or cross-referenced within referenced documents. The complete list of final UFC documents is located on the Whole Building Design Guide at http://www.wbdg.org/ccb/browse_cat.php?o=29&c=4 . The following are significant UFC's available on the website above that are applicable to this project:

UFC 1-200-01, *General Building Requirements*

UFC 1-300-09N, *Design Procedures*

UFC 3-120-10, *Interior Design*

UFC 3-201-02, *Landscape Architecture*

UFC 3-220-01N, *Geotechnical Engineering Procedures for Foundation Design of Buildings and Structures*

UFC 3-301-01, *Structural Engineering*

UFC 3-400-01, *Energy Conservation*

UFC 3-420-01, *Plumbing Systems*

UFC 3-501-01, *Electrical Engineering*

UFC 3-560-01, *Electrical Safety; O&M*

UFC 3-580-10, *Design: Navy and Marine Corps Intranet (NMCI) Standard Construction Practices*

UFC 3-600-01, *Fire Protection Engineering for Facilities*

UFC 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings* (This Antiterrorism Standard has wide ranging effect. Refer to Part 3 for examples of discipline related building components that are

affected)

UFC 4-010-02, *DoD Minimum Standoff distances for Buildings*(For Official Use Only)

UFC 4-012-17, *Security Engineering: Design of Electronic Security Systems*

UFC 4-022-03, *Security Engineering: Design of Security Fencing, Gates, Barriers, and Guard Facilities*

UFC 4-023-03, *Design of Buildings to Resist Progressive Collapse*

OTHER NAVY-ONLY UNIFIED FACILITIES CRITERIA:

Other Navy-only UFC's are located in the DESIGN GUIDANCE TAB on the Navy Design-Build Request for Proposal Website at http://www.wbdg.org/ndbm/DesignGuid/DesignGuid.html?Tab=DesignGuid . The following are "Draft" Navy-only UFC documents that are applicable as final documents on this project:

UFC 3-100-10N, *Architecture*

UFC 3-200-10N, *Civil Engineering*

UFC 3-400-10N, *Mechanical Engineering*

UFC 3-600-10N, *Fire Protection Engineering*

UFC 3-800-10N, *Environmental Engineering for Facility Construction*

UFC 4-020-01, *DOD Security Engineering Facility Planning Manual*

UFC 4-021-02NF, *Security Engineering Design of Electronic Security Systems*

Z10 1.2.3.2 FEDERAL STANDARDS

Uniform Federal Accessibility Standard (UFAS)

American with Disabilities Act Architectural Guidelines (ADAAG)

Occupational Safety and Health Association (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 shall 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 shall 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 shall be new, and shall 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 shall be listed and labeled suitable for the specified purpose, environment, and application and installed in accordance with manufacturer’s recommendations. Insulation shall be asbestos free.

Z10 1.3.2 EQUIPMENT NAMEPLATE IDENTIFICATION

Each item of equipment shall 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 the Project Program paragraph 2.2.3. Refer to UFGS section 01 45 00.05 20, *Design and Construction Quality Control*for commissioning requirements. 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 shall 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 shall 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 UFGS sections 01 33 00.05 20, *Construction Submittal Procedures*and 01 33 10.05 20, *Design Submittal Procedures*. Contractor's construction submittals that submitted separate from the design submittals must comply with UFGS 01 33 00.05 20, *Construction Submittal Procedures*.

Refer to ""Construction Quality Control" in UFGS 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

Design submittals shall be in accordance with Unified Facility Guide Specification (UFGS) section 01 33 10.05 20, *Design Submittal Procedures*, UFC 1-300-09N, *Design Procedures*, and other discipline-specific guidelines listed in the applicable PTS sections.

Some PTS sections identify and utilize UFGS sections as a project requirement. When a PTS section requires the use of a UFGS section, the Designer of Record (DOR) shall edit these UFGS sections for the project and submit the edited specification as a part of the design submittal. These required UFGS sections may only be augmented by manufacturer's data and catalog cuts in the design submittal. The manufacturer’s data and catalog cuts can not take the place of these required specification sections in a combined design and construction submittal.

The DOR shall (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, and (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.

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 Section 01 33 00.05 20 for the list of construction submittals reserved for Government Approval and Government Surveillance.

--End of Section--

PART 5

PRESCRIPTIVE TECHNICAL SPECIFICATIONS

SECTION 23 09 23.13 20

BACnet DIRECT DIGITAL CONTROL SYSTEMS FOR HVAC
08/09

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AIR MOVEMENT AND CONTROL ASSOCIATION INTERNATIONAL (AMCA)

AMCA 500-D	(1998) Laboratory Methods of Testing Dampers for Rating

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI/ATA 878.1	(1999) ARCNET - Local Area Network: Token Ring

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

ASHRAE 135	(2008; Addenda J,L,Q,R,S,V 2009; Errata 1 & 2 2009:INT 1 & 2 2009) BACnet—A Data Communication Protocol for Building Automation and Control Networks

ASME INTERNATIONAL (ASME)

ASME B16.18	(2001; R 2005) Cast Copper Alloy Solder Joint Pressure Fittings
ASME B16.22	(2001; R 2005) Standard for Wrought Copper and Copper Alloy Solder Joint Pressure Fittings
ASME B16.26	(2006) Standard for Cast Copper Alloy Fittings for Flared Copper Tubes
ASME B16.34	(2009) Valves - Flanged, Threaded and Welding End
ASME B16.5	(2009) Standard for Pipe Flanges and Flanged Fittings: NPS 1/2 Through NPS 24
ASME B31.1	(2007; Addenda a-2008) Power Piping
ASME B40.100	(2005) Pressure Gauges and Gauge Attachments
ASME BPVC	(2007) all Purpose Codes and Standards Boiler and Pressure Vessels Codes

ASTM INTERNATIONAL (ASTM)

ASTM A 126	(2004) Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings
ASTM B 117	(2009) Standing Practice for Operating Salt Spray (Fog) Apparatus
ASTM B 32	(2008) Standard Specification for Solder Metal
ASTM B 75	(2002) Standard Specification for Seamless Copper Tube
ASTM B 88	(2009) Standard Specification for Seamless Copper Water Tube
ASTM B 88M	(2005) Standard Specification for Seamless Copper Water Tube (Metric)
ASTM D 1238	(2004c) Melt Flow Rates of Thermoplastics by Extrusion Plastometer
ASTM D 1693	(2008) Standard Test Method for Environmental Stress-Cracking of Ethylene Plastics
ASTM D 635	(2006) Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastics in a Horizontal Position
ASTM D 638	(2008) Standard Test Method for Tensile Properties of Plastics
ASTM D 792	(2008) Density and Specific Gravity (Relative Density) of Plastics by Displacement

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE C57.13	(2008) Standard Requirements for Instrument Transformers
IEEE C62.41.1	(2002; R 2008) Guide on the Surges Environment in Low-Voltage (1000 V and Less) AC Power Circuits
IEEE C62.41.2	(2002) Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and Less) AC Power Circuits
IEEE C62.45	(2002; R 2008) Recommended Practice on Surge Testing for Equipment Connected to Low-Voltage (1000v and less)AC Power Circuits

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

ISO/IEC 8802-3	(2000) Information Technology - Telecommunications and Information Exchange Between Systems - Local and Metropolitan Area Networks - Specific Requirements - Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD)Access Method and Physical Layer Specifications

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA/ANSI C12.10	(2004) Physical Aspects of Watthour Meters - Safety Standards

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2008; AMD 1 2008) National Electrical Code
NFPA 72	(2010; Am 10-2; Am 10-3; Proposed Am 971) National Fire Alarm and Signaling Code
NFPA 90A	(2009; Errata 09-1) Standard for the Installation of Air Conditioning and Ventilating Systems

SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)

SMACNA 1966	(2005) HVAC Duct Construction Standards Metal and Flexible, 3rd Edition

UNDERWRITERS LABORATORIES (UL)

UL 1449	(2006; R 1998 thru 2009) Standard for Surge Protective Devices
UL 506	(2008; R 2009) Standard for Specialty Transformers
UL 508A	(2001; R 2003 thru 2009) Standard for Industrial Control Panels
UL 916	(2007; R 2009) Standard for Energy Management Equipment

1.2 DEFINITIONS

1.2.1 ANSI/ASHRAE Standard 135

ANSI/ASHRAE Standard 135: BACnet - A Data Communication Protocol for Building Automation and Control Networks, referred to as "BACnet". ASHRAE developed BACnet to provide a method for diverse building automation devices to communicate and share data over a network.

1.2.2 ARCNET

ANSI/ATA 878.1 - Attached Resource Computer Network. ARCNET is a

deterministic LAN technology; meaning it's possible to determine the maximum delay before a device is able to transmit a message.

1.2.3 BACnet

Building Automation and Control Network; the common name for the communication standard ASHRAE 135. The standard defines methods and protocol for cooperating building automation devices to communicate over a variety of LAN technologies.

1.2.4 BACnet/IP

An extension of BACnet, Annex J, defines this mechanism using a reserved UDP socket to transmit BACnet messages over IP networks. A BACnet/IP network is a collection of one or more IP subnetworks that share the same BACnet network number. See also "BACnet Broadcast Management Device".

1.2.5 BACnet Internetwork

Two or more BACnet networks, possibly using different LAN technologies, connected with routers. In a BACnet internetwork, there exists only one message path between devices.

1.2.6 BACnet Network

One or more BACnet segments that have the same network address and are interconnected by bridges at the physical and data link layers.

1.2.7 BACnet Segment

One or more physical segments of BACnet devices on a BACnet network, connected at the physical layer by repeaters.

1.2.8 BBMD

BACnet Broadcast Management Device (BBMD). A communications device, typically combined with a BACnet router. A BBMD forwards BACnet broadcast messages to BACnet/IP devices and other BBMDs connected to the same BACnet/IP network. Every IP subnetwork that is part of a BACnet/IP network must have only one BBMD. See also "BACnet/IP".

1.2.9 BAS

Building Automation Systems, including DDC (Direct Digital Controls) used for facility automation and energy management.

1.2.10 BAS Owner

The regional or local user responsible for managing all aspects of the BAS operation, including: network connections, workstation management, submittal review, technical support, control parameters, and daily operation. The BAS Owner for this project is [_____].

1.2.11 BIBBs

BACnet Interoperability Building Blocks. A collection of BACnet services used to describe supported tasks. BIBBs are often described in terms of "A" (client) and "B" (server) devices. The “A” device uses data provided by the "B" device, or requests an action from the “B” device.

1.2.12 BI

BACnet International, formerly two organizations: the BACnet Manufacturers Association (BMA) and the BACnet Interest Group - North America (BIG-NA).

1.2.13 BI/BTL

BACnet International/BACnet Testing Laboratories (Formerly BMA/BTL). The organization responsible for testing products for compliance with the BACnet standard, operated under the direction of BACnet International.

1.2.14 Bridge

Network hardware that connects two or more network (or BACnet internetwork) segments at the physical and data link layers. A bridge may also filter messages.

1.2.15 Broadcast

A message sent to all devices on a network segment.

1.2.16 Device

Any control system component, usually a digital controller, that contains a BACnet Device Object and uses BACnet to communicate with other devices. See also "Digital Controller".

1.2.17 Device Object

Every BACnet device requires one Device Object, whose properties represent the network visible properties of that device. Every Device Object requires a unique Object Identifier number on the BACnet internetwork. This number is often referred to as the device instance.

1.2.18 Device Profile

A collection of BIBBs determining minimum BACnet capabilities of a device, defined in ASHRAE Standard 135-2004, Annex L. Standard device profiles include BACnet Operator Workstations (B-OWS), BACnet Building Controllers (B-BC), BACnet Advanced Application Controllers (B-AAC), BACnet Application Specific Controllers (B-ASC), BACnet Smart Actuator (B-SA), and BACnet Smart Sensor (B-SS). Each device used in new construction is required to have a PICS statement listing BIBBs supported.

1.2.19 Digital Controller

An electronic controller, usually with internal programming logic and digital and analog input/output capability, which performs control functions. In most cases, synonymous with a BACnet device described in this specification. See also "Device".

1.2.20 Direct Digital Control (DDC)

Digital controllers performing control logic. Usually the controller directly senses physical values, makes control decisions with internal programs, and outputs control signals to directly operate switches, valves, dampers, and motor controllers.

1.2.21 DDC System

A network of digital controllers, communication architecture, and user interfaces. A DDC system may include programming, sensors, actuators, switches, relays, factory controls, operator workstations, and various other devices, components, and attributes.

1.2.22 Ethernet

A family of local-area-network technologies providing high-speed networking features over various media.

1.2.23 Firmware

Software programmed into read only memory (ROM), flash memory, electrically erasable programmable read only memory (EEPROM), or erasable programmable read only memory (EPROM) chips.

1.2.24 Gateway

Communication hardware connecting two or more different protocols, similar to human language translators. The Gateway translates one protocol into equivalent concepts for the other protocol. In BACnet applications, a gateway has BACnet on one side and non-BACnet (usually proprietary) protocols on the other side.

1.2.25 Half Router

A device that participates as one partner in a BACnet point-to-point (PTP) connection. Two half-routers in an active PTP connection combine to form a single router.

1.2.26 Hub

A common connection point for devices on a network.

1.2.27 Internet Protocol (IP, TCP/IP, UDP/IP)

A communication method, the most common use is the World Wide Web. At the lowest level, it is based on Internet Protocol (IP), a method for conveying and routing packets of information over various LAN media. Two common protocols using IP are User Datagram Protocol (UDP) and Transmission Control Protocol (TCP). UDP conveys information to well-known "sockets" without confirmation of receipt. TCP establishes "sessions", which have end-to-end confirmation and guaranteed sequence of delivery.

1.2.28 Input/Output (I/O)

Physical inputs and outputs to and from a device, although the term sometimes describes software, or "virtual" I/O. See also "Points".

1.2.29 I/O Expansion Unit

An I/O expansion unit provides additional point capacity to a digital controller.

1.2.30 IP subnet

Internet protocol (IP) identifies individual devices with a 32-bit number

divided into four groups from 0 to 255. Devices are often grouped and share some portion of this number. For example, one device has IP address 209.185.47.68 and another device has IP address 209.185.47.82. These two devices share Class C subnet 209.185.47.00

1.2.31 Local-Area Network (LAN)

A communication network that spans a limited geographic area and uses the same basic communication technology throughout.

1.2.32 LonTalk

ANSI/EIA 709. A communication protocol developed by Echelon Corp. LonTalk is an optional physical and data link layer for BACnet.

1.2.33 MAC Address

Media Access Control address. The physical node address that identifies a device on a Local Area Network.

1.2.34 Master-Slave/Token-Passing (MS/TP)

ISO/IEC 8802-3. One of the LAN options for BACnet. MSTP uses twisted-pair wiring for relatively low speed and low cost communication (up to 4,000 ft at 76.8K bps).

1.2.35 Native BACnet Device

A device that uses BACnet as its primary, if not only, method of communication with other BACnet devices without intermediary gateways. A system that uses native BACnet devices at all levels is a native BACnet system.

1.2.36 Network

Communication technology for data communications. BACnet approved network types are BACnet over Internet Protocol (IP), Point to Point (PTP) Ethernet, ARCNET, MS/TP, and LonTalk®.

1.2.37 Network Number

A site-specific number assigned to each network segment to identify for routing. This network number must be unique throughout the BACnet internetwork.

1.2.38 Object

The concept of organizing BACnet information into standard components with various associated properties. Examples include analog input objects and binary output objects.

1.2.39 Object Identifier

An object property used to identify the object, including object type and instance. Object Identifiers must be unique within a device.

1.2.40 Object Properties

Attributes of an object. Examples include present value and high limit

properties of an analog input object. Properties are defined in ASHRAE 135; some are optional and some are required. Objects are controlled by reading from and writing to object properties.

1.2.41 Peer-to-Peer

Peer-to-peer refers to devices where any device can initiate and respond to communication with other devices.

1.2.42 Performance Verification Test (PVT)

The procedure for determining if the installed BAS meets design criteria prior to final acceptance. The PVT is performed after installation, testing, and balancing of mechanical systems. Typically the PVT is performed by the Contractor in the presence of the Government.

1.2.43 PID

Proportional, integral, and derivative control; three parameters used to control modulating equipment to maintain a setpoint. Derivative control is often not required for HVAC systems (leaving "PI" control).

1.2.44 PICS

Protocol Implementation Conformance Statement (PICS), describing the BACnet capabilities of a device. See BACnet, Annex A for the standard format and content of a PICS statement.

1.2.45 Points

Physical and virtual inputs and outputs. See also "Input/Output".

1.2.46 PTP

Point-to-Point protocol connects individual BACnet devices or networks using serial connections like modem-to-modem links.

1.2.47 Repeater

A network component that connects two or more physical segments at the physical layer.

1.2.48 Router

A BACnet router is a component that joins together two or more networks using different LAN technologies. Examples include joining a BACnet Ethernet LAN to a BACnet MS/TP LAN.

1.2.49 Stand-Alone Control

Refers to devices performing equipment-specific and small system control without communication to other devices or computers for physical I/O, excluding outside air and other common shared conditions. Devices are located near controlled equipment, with physical input and output points limited to 64 or less per device, except for complex individual equipment or systems. Failure of any single device will not cause other network devices to fail. BACnet "Smart" actuators (B-SA profile) and sensors (B-SS profile) communicating on a network with a parent device are exempt from stand-alone requirements.

[1.3 SUBCONTRACTOR SPECIAL REQUIREMENTS
Perform all work in this section in accordance with the paragraph entitled "Subcontractor Special Requirements" in Section 01 30 00 ADMINISTRATIVE REQUIREMENTS. The paragraph specifies that all contract requirements of this section shall be accomplished directly by a first tier subcontractor. No work required shall be accomplished by a second tier subcontractor.]

1.4 BACnet DIRECT DIGITAL CONTROL SYSTEMS FOR HVAC DESCRIPTION

a. [Remove existing and] [provide new BACnet] [and] [modify existing] [and merge with existing non-BACnet] [and merge with existing BACnet] DDC systems including associated equipment and accessories. All new devices are accessible using a Web browser interface and communicate using ASHRAE 135 BACnet communications without the use of gateways, unless gateways are shown on the design drawings and specifically requested by the Government. Where gateways are allowed, they must support ASHRAE 135, including all object properties and read-write services shown on Government approved interoperability schedules. Manufacturer's products, including design, materials, fabrication, assembly, inspection, and testing shall be in accordance with ASHRAE 135, ASME B31.1, and NFPA 70, except where indicated otherwise.

[b. The existing DDC system is manufactured by [_____]. The server and operator workstation are located at [_____]. If installing a system made by the same manufacturer, upgrade or replace the existing server, operator workstation, and laptop computer software with the manufacturer's latest software version for all used applications. Upgrade hardware, memory, and operating systems if required.]

1.4.1 Design Requirements

1.4.1.1 Control System Drawings Title Sheet

Provide a title sheet for the control system drawing set. Include the project title, project location, contract number, the controls contractor preparing the drawings, an index of the control drawings in the set, and a legend of the symbols and abbreviations used throughout the control system drawings.

1.4.1.2 List of I/O Points

Also known as a Point Schedule, provide for each input and output point physically connected to a digital controller: point name, point description, point type (Analog Output (AO), Analog Input (AI), Binary Output (BO), Binary Input (BI)), point sensor range, point actuator range, point address, BACnet object, associated BIBBS (where applicable), and point connection terminal number. Typical schedules for multiple identical equipment are allowed unless otherwise requested in design or contract criteria.

1.4.1.3 Control System Components List

Provide a complete list of control system components installed on this project. Include for each controller and device: control system schematic name, control system schematic designation, device description, manufacturer, and manufacturer part number. For sensors, include point name, sensor range, and operating limits. For valves, include body style, Cv, design flow rate, pressure drop, valve characteristic (linear or equal

percentage), and pipe connection size. For actuators, include point name, spring or non-spring return, modulating or two-position action, normal (power fail) position, nominal control signal operating range (0-10 volts DC or 4-20 milliamps), and operating limits.

1.4.1.4 Control System Schematics

Provide control system schematics. Typical schematics for multiple identical equipment are allowed unless otherwise requested in design or contract criteria. Include the following:

a. Location of each input and output device

b. Flow diagram for each piece of HVAC equipment

c. Name or symbol for each control system component, such as V-1 for a valve

d. Setpoints, with differential or proportional band values

e. Written sequence of operation for the HVAC equipment

f. Valve and Damper Schedules, with normal (power fail) position

1.4.1.5 HVAC Equipment Electrical Ladder Diagrams

Provide HVAC equipment electrical ladder diagrams. Indicate required electrical interlocks.

1.4.1.6 Component Wiring Diagrams

Provide a wiring diagram for each type of input device and output device. Indicate how each device is wired and powered; showing typical connections at the digital controller and power supply. Show for all field connected devices such as control relays, motor starters, actuators, sensors, and transmitters.

1.4.1.7 Terminal Strip Diagrams

Provide a diagram of each terminal strip. Indicate the terminal strip location, termination numbers, and associated point names.

1.4.1.8 BACnet Communication Architecture Schematic

Provide a schematic showing the project's entire BACnet communication network, including addressing used for LANs, LAN devices including routers and bridges, gateways, controllers, workstations, and field interface devices. If applicable, show connection to existing networks.

1.5 SUBMITTALS

Submit detailed and annotated manufacturer's data, drawings, and specification sheets for each item listed, that clearly show compliance with the project specifications.

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following according to 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Include the following in the project's control system drawing set:

Control system drawings title sheet; G

List of I/O Points; G

Control System Components List; G

Control system schematics; G

HVAC Equipment Electrical Ladder diagrams; G

Component wiring diagrams; G

Terminal strip diagrams; G

BACnet communication architecture schematic; G

SD-03 Product Data

Direct Digital Controllers; G

Include BACnet PICS for each controller/device type, including smart sensors (B-SS) and smart actuators (B-SA).

BACnet Gateways; G

Include BACnet and workstation display information; bi-directional communication ability; compliance with interoperability schedule; expansion capacity; handling of alarms, events, scheduling and trend data; and single device capability (not depending on multiple devices for exchanging information from either side of the gateway).

BACnet Protocol Analyzer; G

Include capability to store and report data traffic on BACnet networks, measure bandwidth usage, filter information, and identify BACnet devices.

DDC Software; G

BACnet Operator Workstation; G

BACnet Operator Workstation DDC Software; G

Include BACnet PICS for Operator Workstation software.

Notebook Computer; G

Sensors and Input Hardware; G

Output Hardware; G

Surge and transient protection; G

Indicators; G

[Air compressors; G]

[Refrigerated air dryers; G]

[Pneumatic tubing; G]

[Duct smoke detectors; G]

[Variable frequency (motor) drives; G]

SD-05 Design Data

Performance Verification Testing Plan; G

Pre-Performance Verification Testing Checklist; G

SD-06 Test Reports

Performance Verification Testing Report; G

SD-07 Certificates

Contractor's Qualifications; G

SD-09 Manufacturer's Field Reports

Pre-PVT Checklist; G

SD-10 Operation and Maintenance Data

Comply with requirements for data packages in Section 01 78 23 OPERATION AND MAINTENANCE DATA, except as supplemented and modified in this specification.

BACnet Direct Digital Control Systems, Data Package 4; G

Controls System Operators Manuals, Data Package 4; G

VFD Service Manuals, Data Package 4; G

SD-11 Closeout Submittals

Training documentation; G

1.6 QUALITY ASSURANCE

1.6.1 Standard Products

Provide material and equipment that are standard manufacturer's products currently in production and supported by a local service organization.

1.6.2 Delivery, Storage, and Handling

Handle, store, and protect equipment and materials to prevent damage before and during installation according to manufacturer's recommendations, and as approved by the Contracting Officer. Replace damaged or defective items.

1.6.3 Operating Environment

Protect components from humidity and temperature variation, dust, and contaminants. If components are stored before installation, keep them within the manufacturer's limits.

1.6.4 Finish of New Equipment

New equipment finishing shall be factory provided. Manufacturer's standard factory finishing shall be proven to withstand 125 hours in a salt-spray fog test. Equipment located outdoors shall be proven to withstand 500 hours in a salt-spray fog test.

Salt-spray fog test shall be according to ASTM B 117, with acceptance criteria as follows: immediately after completion of the test, the finish shall show no signs of degradation or loss of adhesion beyond 0.125 inch on either side of the scratch mark.

1.6.5 Verification of Dimensions

The contractor shall verify all dimensions in the field, and advise the Contracting Officer of any discrepancy before performing work.

1.6.6 Contractor's Qualifications

Submit documentation certifying the controls Contractor performing the work has completed at least three DDC systems installations of a similar design to this project, and programmed similar sequences of operation for at least two years.

1.6.7 Modification of References

The advisory provisions in ASME B31.1 and NFPA 70 are mandatory. Substitute "shall" for "should" wherever it appears and interpret all references to the "authority having jurisdiction" and "owner" to mean the Contracting Officer.

1.6.8 Project Sequence

The control system work for this project shall proceed in the following order:

a. Submit and receive approval on the Shop Drawings, Product Data, and Certificates specified under the paragraph entitled "SUBMITTALS."

b. Perform the control system installation work, including all field check-outs and tuning.

c. Provide support to TAB personnel as specified under the paragraph "TEST AND BALANCE SUPPORT."

d. Submit and receive approval of the Controls System Operators Manual specified under the paragraph "CONTROLS SYSTEM OPERATORS MANUALS."

e. Submit and receive approval of the Performance Verification Testing Plan and the Pre-PVT Checklist specified under the paragraph "PERFORMANCE VERIFICATION TESTING."

f. Perform the Performance Verification Testing.

g. Submit and receive approval on the PVT Report.

h. Submit and receive approval on the Training Documentation specified under the paragraph "INSTRUCTION TO GOVERNMENT PERSONNEL"[and "VFD Service Support"]. Submit at least 30 days before training.

i. Deliver the final Controls System Operators Manuals[and VFD Service Manuals].

j. Conduct the Phase I Training[and VFD on-site/hands-on training].

k. Conduct the Phase II Training.

l. Submit and receive approval of Closeout Submittals.

PART 2 PRODUCTS

2.1 DDC SYSTEM

a. Provide a networked DDC system for stand-alone control in compliance with the latest revision of the ASHRAE 135 BACnet standard. Include all programming, objects, and services required to meet the sequence of control. Provide BACnet communications between the DDC system and native BACnet devices furnished with HVAC equipment [and plant equipment including boilers, chillers, and variable frequency drives]. [Devices provided shall be certified in the BACnet Testing Laboratories (BTL) Product Listing.]

[b. Provide an operator workstation [and new server] with complete interface software capable of programming, configuring, and monitoring the digital controllers.][Interface the new DDC system with the site's existing server and operator workstation and software including graphic creation, scheduling, alarming, and trending. The server and workstation are located at [_____]]

2.1.1 Direct Digital Controllers

Direct digital controllers shall be UL 916 rated.

2.1.1.1 I/O Point Limitation

The total number of I/O hardware points used by a single stand-alone digital controller, including I/O expansion units, shall not exceed 64, except for complex individual equipment or systems. Place I/O expansion units in the same cabinet as the digital controller.

2.1.1.2 Environmental Limits

Controllers shall be suitable for, or placed in protective enclosures suitable for the environment (temperature, humidity, dust, and vibration) where they are located.

2.1.1.3 Stand-Alone Control

Provide stand-alone digital controllers.

2.1.1.4 Internal Clock

Provide internal clocks for all BACnet Building Controllers (B-BC) and BACnet Advanced Application Controllers (B-AAC) using BACnet time synchronization services. Automatically synchronize system clocks daily from an operator-designated controller. The system shall automatically adjust for daylight saving time.

2.1.1.5 Memory

Provide sufficient memory for each controller to support the required control, communication, trends, alarms, and messages. Protect programs residing in memory with EEPROM, flash memory, or by an uninterruptible power source (battery or uninterruptible power supply). The backup power source shall have capacity to maintain the memory during a 72-hour continuous power outage. Rechargeable power sources shall be constantly charged while the controller is operating under normal line power. Batteries shall be replaceable without soldering. Trend and alarm history collected during normal operation shall not be lost during power outages less than 72 hours long.

2.1.1.6 Immunity to Power Fluctuations

Controllers shall operate at 90 percent to 110 percent nominal voltage rating.

2.1.1.7 Transformer

The controller power supply shall be fused or current limiting and rated at 125 percent power consumption.

2.1.1.8 Wiring Terminations

Use screw terminal wiring terminations for all field-installed controllers. Provide field-removable modular terminal strip or a termination card connected by a ribbon cable for all controllers other than terminal units.

2.1.1.9 Input and Output Interface

Provide hard-wired input and output interface for all controllers as follows:

a. Protection: Shorting an input or output point to itself, to another point, or to ground shall cause no controller damage. Input or output point contact with sources up to 24 volts AC or DC for any duration shall cause no controller damage.

b. Binary Inputs: Binary inputs shall have a toggle switch and monitor on and off contacts from a "dry" remote device without external power, and external 5-24 VDC voltage inputs.

c. Pulse Accumulation Inputs: Pulse accumulation inputs shall conform to binary input requirements and accumulate pulses at a resolution suitable to the application.

d. Analog Inputs: Analog inputs shall monitor low-voltage (0-10 VDC), current (4-20 mA), or resistance (thermistor or RTD) signals.

e. Binary Outputs: Binary outputs shall have a toggle switch and send a pulsed 24 VDC low-voltage signal for modulation control, or provide a maintained open-closed position for on-off control. For HVAC equipment and plant controllers, provide for manual overrides, either with three-position (on-off-auto) override switches and status lights, or with an adjacent operator display and interface. Where appropriate, provide a method to select normally open or normally closed operation.

f. Analog Outputs: Analog outputs shall send modulating 0-10 VDC or 4-20 mA signals to control output devices.

g. Tri-State Outputs: Tri-State outputs shall provide three-point floating control of terminal unit electronic actuators.

2.1.1.10 Digital Controller BACnet Internetwork

Provide a BACnet internetwork with control products, communication media, connectors, repeaters, hubs, and routers. Provide intermediate gateways, only when requested by the Government and shown on the contract drawings, to connect existing non-BACnet devices to the BACnet internetwork. Controller and operator interface communication shall conform to ASHRAE 135, BACnet. [Use the building's existing Ethernet backbone for network segments marked "existing" on project drawings. Coordinate connections to existing Ethernet backbones with the BAS Owner and LAN administrator.] If a controller becomes non-responsive, the remaining controllers shall continue operating and not be affected by the failed controller.

2.1.1.11 Communications Ports

a. Direct-Connect Interface Ports: Provide at least one extra communication port at each local BACnet network for direct connecting a notebook computer or BACnet hand-held terminal so all network BACnet objects and properties may be viewed and edited by the operator.

b. Telecommunications Interface Port: Provide one telecommunication port per building, permitting remote communication via point-to-point (PTP) protocol over telephone lines.

2.1.1.12 Modems

Provide [v.92] [DSL] modems where required for communication between the BACnet Operator Workstation (B-OWS) and the DDC system.

2.1.1.13 BACnet Gateways

Provide BACnet communication ports, whenever available as a plant equipment OEM standard option, for DDC integration via a single communication cable. Typical BACnet controlled plant equipment includes, but is not limited to, boilers, chillers, and variable frequency motor drives.

Provide gateways to connect BACnet to legacy systems, existing non-BACnet devices, and existing non-BACnet DDC controlled plant equipment, only when specifically requested and approved by the Government, and shown on the Government approved BACnet Communication Architecture Schematic. Provide with each gateway an interoperability schedule [Use gateway interoperability schedules shown on design drawings or other project documents], showing each point or event on the legacy side that the BACnet

"client" will read, and each parameter that the BACnet network will write to. Describe this interoperability in terms of BACnet services, or Interoperability Building Blocks (BIBBS), defined in ASHRAE 135 Annex K. Provide two-year minimum warranty for each gateway, including parts and labor.

The following minimum capabilities are required:

a. Gateways shall be able to read and view all readable object properties listed in the interoperability schedule on the non-BACnet network to the BACnet network and vice versa where applicable.

b. Gateways shall be able to write to all writeable object properties listed in the interoperability schedule on the non-BACnet network from the BACnet network and vice versa where applicable.

c. Gateways shall provide single-pass (only one protocol to BACnet without intermediary protocols) translation from the non-BACnet protocol to BACnet and vice versa.

d. Gateways shall meet the requirements of Data Sharing Read Property (DS-RP-B), Data Sharing Write Property (DS-WP-B), Device Management Dynamic Device Binding-B (DM-DDB-B), and Device Management Communication Control (DM-DCC-B) BIBBs, in accordance with ASHRAE 135.

e. Gateways shall include all hardware, software, software licenses, and configuration tools for operator-to-gateway communications. Provide backup programming and parameters on CD media and the ability to modify, download, backup, and restore gateway configuration.

2.1.1.14 Digital Controller Cabinet

Provide each digital controller in a factory fabricated cabinet enclosure. Cabinets located indoors shall protect against dust and have a minimum NEMA 1 rating, except where indicated otherwise. Cabinets located outdoors or in damp environments shall protect against all outdoor conditions and have a minimum NEMA 4 rating. Outdoor control panels and controllers must be able to withstand extreme ambient conditions, without malfunction or failure, whether or not the controlled equipment is running. If necessary, provide a thermostatically controlled panel heater in freezing locations, and an internal ventilating fan in locations exposed to direct sunlight. Cabinets shall have a hinged lockable door and an offset removable metal back plate, except controllers integral with terminal units, like those mounted on VAV boxes. Provide like-keyed locks for all hinged panels provided and a set of two keys at each panel, with one key inserted in the lock.

2.1.1.15 Main Power Switch and Receptacle

Provide each control cabinet with a main external power on/off switch located inside the cabinet. Also provide each cabinet with a separate 120 VAC duplex receptacle.

2.1.2 DDC Software

2.1.2.1 Programming

Provide programming to execute the sequence of operation indicated. Provide all programming and tools to configure and program all controllers.

Provide programming routines in simple, easy-to-follow logic with detailed text comments describing what the logic does and how it corresponds to the project's written sequence of operation.

a. Graphic-based programming shall use a library of function blocks made from pre-programmed code designed for BAS control. Function blocks shall be assembled with interconnecting lines, depicting the control sequence in a flowchart. If providing a computer with device programming tools as part of the project, graphic programs shall be viewable in real time showing present values and logical results from each function block.

b. Menu-based programming shall be done by entering parameters, definitions, conditions, requirements, and constraints.

c. For line-by-line and text-based programming, declare variable types (local, global, real, integer, etc.) at the beginning of the program. Use descriptive comments frequently to describe the programming.

d. If providing a computer with device programming tools as part of the project, provide a means for detecting program errors and testing software strategies with a simulation tool. Simulation may be inherent within the programming software suite, or provided by physical controllers mounted in a NEMA 1 test enclosure. The test enclosure shall contain one dedicated controller of each type provided under this contract, complete with power supply and relevant accessories.

2.1.2.2 Parameter Modification

All writeable object properties, and all other programming parameters needed to comply with the project specification shall be adjustable for devices at any network level, including those accessible with web-browser communication, and regardless of programming methods used to create the applications.

2.1.2.3 Short Cycling Prevention

Provide setpoint differentials and minimum on/off times to prevent equipment short cycling.

2.1.2.4 Equipment Status Delay

Provide an adjustable delay from when equipment is commanded on or off and when the control program looks to the status input for confirmation.

2.1.2.5 Run Time Accumulation

Use the Elapsed Time Property to provide re-settable run time accumulation for each Binary Output Object connected to mechanical loads greater than 1 HP, electrical loads greater than 10 KW, or wherever else specified.

2.1.2.6 Timed Local Override

Provide an adjustable override time for each push of a timed local override button.

2.1.2.7 Time Synchronization

Provide time synchronization, including adjustments for leap years,

daylight saving time, and operator time adjustments.

2.1.2.8 Scheduling

Provide operating schedules as indicated, with equipment assigned to groups. Changing the schedule of a group shall change the operating schedule of all equipment in the group. Groups shall be capable of operator creation, modification, and deletion. Provide capability to view and modify schedules in a seven-day week format. Provide capability to enter holiday and override schedules one full year at a time.

2.1.2.9 Object Property Override

Allow writeable object property values to accept overrides to any valid value. Where specified or required for the sequence of control, the Out_Of_Service property of Objects shall be modifiable using BACnet's write property service. When documented, exceptions to these requirement are allowed for life, machine, and process safeties.

2.1.2.10 Alarms and Events

Alarms and events shall be capable of having programmed time delays and high-low limits. When a computer workstation or web server is connected to the BACnet internetwork, alarms/events shall report to the computer, printer, [alphanumeric pager,][e-mail,][cell phone,] as defined by an authorized operator. Otherwise alarms/events shall be stored within a device on the BACnet network until connected to a user interface device and retrieved. Provide alarms/events in agreement with the point schedule, sequence of operation, and the BAS Owner. At a minimum, provide programming to initiate alarms/events any time a piece of equipment fails to operate, a control point is outside normal range or condition shown on schedules, communication to a device is lost, a device has failed, or a controller has lost its memory.

2.1.2.11 Trending

Provide BACnet trend services capable of trending all object present values set points, and other parameters indicated for trending on project schedules. Trends may be associated into groups, and a trend report may be set up for each group. Trends are stored within a device on the BACnet network, with operator selectable trend intervals from 10 seconds up to 60 minutes. The minimum number of consecutive trend values stored at one time shall be 100 per variable. When trend memory is full, the most recent data shall overwrite the oldest data.

The operator workstation shall upload trends automatically upon reaching 3/4 of the device buffer limit (via Notification_Threshold property), by operator request, or by time schedule for archiving. Archived and real-time trend data shall be available for viewing numerically and graphically for at the workstation and connected notebook computers.

2.1.2.12 Device Diagnostics

Each controller shall have diagnostic LEDs for power, communication, and device fault condition. The DDC system shall recognize and report a non-responsive controller.

2.1.2.13 Power Loss

Upon restoration of power, the DDC system shall perform an orderly restart and restoration of control.

2.1.3 BACnet Operator Workstation

The workstation shall be capable of accessing all DDC system devices and communicate using the BACnet protocol. The workstation shall be capable of displaying, modifying, creating, archiving, and deleting (as applicable): all points, objects, object properties, programming, alarms, trends, messages, schedules, and reports.

2.1.3.1 BACnet Operator Workstation Hardware

Configure according to system manufacturer's specifications and conforming to BACnet Operator Workstation (B-OWS) device standards found in ASHRAE 135, Annex L. Install to permit complete monitoring and troubleshooting of the DDC system.

At a minimum the workstation hardware shall include: a desktop personal computer with Microsoft Windows XP or VISTA Professional operating system or equal, processor and RAM exceeding capability and speed required by operating system and application software, hard drive capacity exceeding software and yearly archive requirements, 16X internal DVD+/-R/RW/CD-RW drive with archive creator software, [external 200 GB USB 2.0 hard drive and cable,] 4 USB 2.0 ports, 10/100 network interface card, [MS/TP card,] 19-inch LCD monitor, internal V.92 modem, sound card with speakers, 101 character keyboard, optical mouse, USB Hub with four USB 2.0 ports and connecting cable, [ink jet] [laser] printer with USB port and cable, [3 matching toner cartridges] [3 matching color and black ink cartridges], 120-volt 800 VA uninterruptible power supply with automatic voltage regulation and 4 minimum battery back-up outlets and 2 surge protected outlets, [[Microsoft Office bundled software,] [Adobe Acrobat Writer,] [and Symantec Ghost disk imaging software or equal]]. Provide all original licenses, installation media, documentation, and recovery CDs capable of restoring the original configuration. Provide a manufacturer's 3-year next business day on-site warranty with the Government listed as the warranty owner.

2.1.3.2 Password Protection

Provide at least five levels of password protection for operator interfaces. The lowest level only allow viewing graphics. The second level allows viewing graphics and changing space temperature setpoints. The third level allows the previous level's capability, plus changing operating schedules. The fourth level allows access to all functions except passwords. The highest level provides all administrator rights and allows full access to all programming, including setting new passwords and access levels. Provide the BAS Owner with the highest level password access. Provide automatic log out if no keyboard or mouse activity is detected after a user-defined time delay.

2.1.3.3 BACnet Operator Workstation DDC Software

Provide the workstation software with the manufacturer's installation CDs and licenses. Configure the software according to the DDC system manufacturer's specifications and in agreement with BACnet Operator Workstation (B-OWS) device standards found in ASHRAE 135, Annex L.

The workstation software shall permit complete monitoring, modification, and troubleshooting interface with the DDC system. The operator interface with the software shall be menu-driven with appropriate displays and menu commands to manipulate the DDC system's objects, point data, operating schedules, control routines, system configuration, trends, alarms, messages, graphics, and reports. Trends shall be capable of graphic display in real time, with variables plotted as functions of time. Each alarmed point shall be capable of displaying its alarm history, showing when it went into alarm, if and when it was acknowledged, and when it went out of alarm. The modification of DDC system parameters and object properties shall be accomplished with "fill in the blank" and/or "point and drag" methods. Modifications shall download to the appropriate controllers at the operator's request.

2.1.3.4 Graphics Software

Provide web-based system graphics viewable on browsers compatible with MS Internet Explorer 6.X or greater using an industry-standard file format such as HTML, BMP, JPEG, or GIF.

Graphic displays shall have full-screen resolution when viewed on the workstation and notebook computers. Dynamic data on graphics pages shall refresh within 10 seconds using an Internet connection, or 30 seconds using a dial-up modem connection. Graphics viewing shall not require additional "plug-in" software like Java, Shockwave and Flash applications unless the software is readily available for free over the Internet, and certified for use with Navy Marine Corps Internet (NMCI) personal computers.

The graphics shall show the present value and object name for each of the project's I/O points on at least one graphic page. Arrange point values and names on the graphic displays in their appropriate physical locations with respect to the floor plan or equipment graphic displayed. Graphics shall allow the operator to monitor current status, view zone and equipment summaries, use point-and-click navigation between graphic pages, and edit setpoints and parameters directly from the screens. Items in alarm shall be displayed using a different color or other obvious visual indicator. Provide graphics with the following:

a. Graphic Types: Provide at least one graphic display for each piece of HVAC equipment, building floor, and controlled zone. Indicate dynamic point values, operating statuses, alarm conditions, and control setpoints on each display. Provide summary pages where appropriate.

   (1) Building Elevation: For buildings more than one story, provide an elevation view of the building with links to each of the building's floor plans. Simulate the building's architecture and include the building number and floor numbers. If possible, use an actual photograph of the building.

   (2) Building Floor Plans: Provide a floor plan graphic for each of the building's floors [and roof] with dynamic display of space temperature and other important data. If used, indicate and provide links to sub-plan areas. If possible, use the project's electronic drawing files for the graphic backgrounds. Provide clear names for important areas, such as "Main Conference Room." Include room names and numbers where applicable. Include features such as stairwells, elevators, and main entrances. Where applicable, include the mechanical room, HVAC equipment, and

control component locations, with corresponding links to the equipment graphics.

(3) Sub-plan Areas: Where a building's floor plan is too large to adequately display on the screen, sub-divide the plan into distinct areas, and provide a separate graphic display for each area. Provide same level of detail requested in building floor plan section above.

(4) HVAC Equipment: Provide a graphic display for each piece of HVAC equipment, such as a fan coil unit, VAV terminal, or air handling unit. Equipment shall be represented by a two or three-dimensional drawing. Where multiple pieces of equipment combine to form a system, such as a central chiller plant or central heating plant, provide one graphic to depict the entire plant. Indicate the equipment, piping, ductwork, dampers, and control valves in the installed location. Include labels for equipment, piping, ductwork, dampers, and control valves. Show the direction of air and water flow. Include dynamic display of applicable object data with clear names in appropriate locations.

(5) Sequence of Operation: Provide a graphic screen displaying the written out full sequence of operation for each piece of HVAC equipment. Provide a link to the sequence of operation displays on their respective equipment graphics.[Include dynamic real-time data within the text for setpoints and variables.]

b. Graphic Title: Provide a prominent, descriptive title on each graphic page.

c. Dynamic Update: When the workstation is on-line, all graphic I/O object values shall update with change-of-value services, or by operator selected discrete intervals.

d. Graphic Linking: Provide forward and backward linking between floor plans, sub-plans, and equipment.

e. Graphic Editing: Provide installed software to create, modify, and delete the DDC graphics. Include the ability to store graphic symbols in a symbol directory and import these symbols into the graphics.

f. Dynamic Point Editing: Provide full editing capability for deleting, adding, and modifying dynamic points on the graphics.

2.1.4 Notebook Computer

Provide a notebook computer, complete with the project's installed DDC software, applications database, and graphics to fully troubleshoot and program the project's devices. Notebook computers for web-based systems do not require this installed software if they have the ability to connect locally in real time, view all graphics, and fully troubleshoot, modify, and program all project devices. Provide the notebook computer with ballistic nylon carrying case with shoulder strap [on wheels with a telescoping handle]with all necessary cables and interface hardware needed for setup and communication with the controllers and control system components.

At a minimum the notebook computer shall include: a Microsoft XP Professional operating system, processor with capability and speed required

by application software, 40 giga-byte hard drive, 512 mega-byte RAM, 2 USB 2.0 ports, 10/100 network interface card,[ARCnet card,] [MS/TP card,] internal V.92 modem, 15-inch display, keyboard, 3-hour battery with charger, 52X internal CD-RW drive with CD creator software, [and Microsoft Office bundled software]. Provide all original licenses, installation media, documentation, and recovery CDs capable of restoring the original configuration. Provide the manufacturer's 3-year next business day on-site warranty with the Government listed as the warranty owner.

2.1.5 BACnet Protocol Analyzer

Provide a BACnet protocol analyzer and required cables and fittings for connection to the BACnet network. The analyzer shall include the following minimum capabilities:

a. Capture and store to a file data traffic on all network levels.

b. Measure bandwidth usage.

c. Filtering options with ability to ignore select traffic.

2.2 SENSORS AND INPUT HARDWARE

Coordinate sensor types with the BAS Owner to keep them consistent with existing installations.

2.2.1 Field-Installed Temperature Sensors

Where feasible, provide the same sensor type throughout the project. Avoid using transmitters unless absolutely necessary.

2.2.1.1 Thermistors

Precision thermistors may be used in applications below 200 degrees F. Sensor accuracy over the application range shall be 0.36 degree F or less between 32 to 150 degrees F. Stability error of the thermistor over five years shall not exceed 0.25 degrees F cumulative. A/D conversion resolution error shall be kept to 0.1 degrees F. Total error for a thermistor circuit shall not exceed 0.5 degrees F.

2.2.1.2 Resistance Temperature Detectors (RTDs)

Provide RTD sensors with platinum elements compatible with the digital controllers. Encapsulate sensors in epoxy, series 300 stainless steel, anodized aluminum, or copper. Temperature sensor accuracy shall be 0.1 percent (1 ohm) of expected ohms (1000 ohms) at 32 degrees F. Temperature sensor stability error over five years shall not exceed 0.25 degrees F cumulative. Direct connection of RTDs to digital controllers without transmitters is preferred. When RTDs are connected directly, lead resistance error shall be less than 0.25 degrees F. The total error for a RTD circuit shall not exceed 0.5 degrees F.

2.2.1.3 Temperature Sensor Details

a. Room Type: Provide the sensing element components within a decorative protective cover suitable for surrounding decor. [Provide room temperature sensors with timed override button, setpoint adjustment lever, digital temperature display.] [Provide a communication port or 802.11x wireless support for a portable operator interface like a

notebook computer or PDA.]

b. Duct Probe Type: Ensure the probe is long enough to properly sense the air stream temperature.

c. Duct Averaging Type: Continuous averaging sensors shall be one foot in length for each 4 square feet of duct cross-sectional area, and a minimum length of 6 feet.

d. Pipe Immersion Type: Provide minimum three-inch immersion. Provide each sensor with a corresponding pipe-mounted sensor well, unless indicated otherwise. Sensor wells shall be stainless steel when used in steel piping, and brass when used in copper piping. Provide the sensor well with a heat-sensitive transfer agent between the sensor and the well interior.

e. Outside Air Type: Provide the sensing element on the building's north side with a protective weather shade that positions the sensor approximately 3 inches off the wall surface, does not inhibit free air flow across the sensing element, and protects the sensor from snow, ice, and rain.

2.2.2 Transmitters

Provide transmitters with 4 to 20 mA or 0 to 10 VDC linear output scaled to the sensed input. Transmitters shall be matched to the respective sensor, factory calibrated, and sealed. Size transmitters for an output near 50 percent of its full-scale range at normal operating conditions. The total transmitter error shall not exceed 0.1 percent at any point across the measured span. Supply voltage shall be 12 to 24 volts AC or DC. Transmitters shall have non-interactive offset and span adjustments. For temperature sensing, transmitter drift shall not exceed 0.03 degrees F a year.

2.2.2.1 Relative Humidity Transmitters

Provide transmitters with an accuracy equal to plus or minus 3 [2] [5] percent from 0 to 90 percent scale, and less than one percent drift per year. Sensing elements shall be the polymer type.

2.2.2.2 Pressure Transmitters

Provide transmitters integral with the pressure transducer.

2.2.3 Current Transducers

Provide current transducers to monitor motor amperage, unless current switches are shown on design drawings or point tables.

2.2.4 Pneumatic to Electric Transducers

Pneumatic to electronic transducers shall convert a 0 to 20 psig signal to a proportional 4 to 20 mA or 0 to 10 VDC signal (operator scaleable). Supply voltage shall be 24 VDC. Accuracy and linearity shall be 1.0 percent or better.

2.2.5 Air Quality Sensors

Provide power supply for each sensor.

2.2.5.1 CO2 Sensors

Provide photo-acoustic type CO2 sensors with integral transducers and linear output. The devices shall read CO2 concentrations between 0 and 2000 ppm with full scale accuracy of at least plus or minus 100 ppm.

2.2.5.2 Air Quality Sensors

Provide full spectrum air quality sensors using a hot wire element based on the Taguchi principle. The sensor shall monitor a wide range of gaseous volatile organic components common in indoor air contaminants like paint fumes, solvents, cigarette smoke, and vehicle exhaust. The sensor shall automatically compensate for temperature and humidity, have span and calibration potentiometers, operate on 24 VDC power with output of 0-10 VDC, and have a service rating of 32 to 140 degrees F and 5 to 95 percent relative humidity.

2.2.6 Input Switches

2.2.6.1 Timed Local Overrides

Provide buttons or switches to override the DDC occupancy schedule programming for each major building zone during unoccupied periods, and to return HVAC equipment to the occupied mode. This requirement is waived for zones clearly intended for 24 hour continuous operation.

2.2.7 Freeze Protection Thermostats

Provide special purpose thermostats with flexible capillary elements 20 feet minimum length for coil face areas up to 40 square feet. Provide longer elements for larger coils at 1-foot of element for every 4 square feet of coil face area, or provide additional thermostats. Provide switch contacts rated for the respective motor starter's control circuit voltage. Include auxiliary contacts for the switch's status condition. A freezing condition at any 18-inch increment along the sensing element's length shall activate the switch. The thermostat shall be equipped with a manual push-button reset switch so that when tripped, the thermostat requires manual resetting before the HVAC equipment can restart.

2.2.8 Air Flow Measurement Stations

Air flow measurement stations shall have an array of velocity sensing elements and straightening vanes inside a flanged sheet metal casing. The velocity sensing elements shall be the RTD or thermistor type, traversing the ducted air in at least two directions. The air flow pressure drop across the station shall not exceed 0.08 inch water gage at a velocity of 2,000 fpm. The station shall be suitable for air flows up to 5,000 fpm, and a temperature range of 40 to 120 degrees F. The station's measurement accuracy over the range of 125 to 2,500 fpm shall be plus or minus 3 percent of the measured velocity. Station transmitters shall provide a linear, temperature-compensated 4 to 20 mA or 0 to 10 VDC output. The output shall be capable of being accurately converted to a corresponding air flow rate in cubic feet per minute. Transmitters shall be a 2-wire, loop powered device. The output error of the transmitter shall not exceed 0.5 percent of the measurement.

2.2.9 Energy Metering

2.2.9.1 Electric Meters

[Provide kilowatt-hour (kWh) meter(s) shown as specified in Section [_____, "_____"]]

[Provide kilowatt-hour (kWh) meter(s) shown in accordance with NEMA/ANSI C12.10, suitable for the intended voltage, phases, and wye/delta configuration, with three current transformers and an output signal compatible with the DDC system. The meter shall have a box-mounted socket and an automatic circuit-closing bypass. Provide the meter with at least four pointer-type kWh registers, provisions for pulse initiation, and universal Class 2 indicating maximum kW demand register, sweep pointer indicating type, and a [15] [30] [60] minute interval. The meter accuracy shall be within plus or minus one percent of the actual kWh. Provide the correct multiplier on the meter face. Provide the current transformers in accordance with IEEE C57.13, with 600-volt insulation, and rated for metering with voltage, IL, momentary, and burden ratings coordinated with the ratings of corresponding meters. Provide butyl-molded donut or window type transformers mounted on a bracket to allow secondary cables to connect to the transformer bushings. Provide wiring identification of the current transformer secondary feeders to permit field measurements to be taken with hook-on ammeters.]

2.2.9.2 Steam Meters

Steam meters shall be the vortex type, with pressure compensation, a minimum turndown ratio of 10 to 1, and an output signal compatible with the DDC system.

2.3 OUTPUT HARDWARE

2.3.1 Control Dampers

Provide factory manufactured [galvanized][stainless] steel dampers where indicated. Control dampers shall comply with SMACNA 1966 except as modified or supplemented by this specification. Published damper leakage rates and respective pressure drops shall have been verified by tests in compliance with AMCA 500-D requirements.

Provide damper assembly frames constructed of 0.064 inch minimum thickness [galvanized][stainless] steel channels with mitered and welded corners. Damper axles shall be 0.5 inches minimum diameter plated steel rods supported in the damper frame by stainless steel or bronze bearings. Blades mounted vertically shall be supported by thrust bearings.

Dampers shall be rated for not less than 2000 fpm air velocity. The pressure drop through each damper when full-open shall not exceed 0.04 inches water gage at 1000 fpm face velocity. Damper assemblies in ductwork subject to above 3-inch water gauge static air pressure shall be constructed to meet SMACNA Seal Class "A" construction requirements.

Provide the damper operating linkages outside of the air stream, including crank arms, connecting rods, and other hardware that transmits motion from the damper actuators to the dampers, shall be adjustable. Additionally, operating linkages shall be designed and constructed to have a 2 to 1

safety factor when loaded with the maximum required damper operating force. Linkages shall be brass, bronze, galvanized steel, or stainless steel.

Provide access doors or panels in hard ceilings and walls for access to all concealed damper operators and damper locking setscrews.

For field-installed control dampers, a single damper section shall have blades no longer than 48 inches and no higher than 72 inches. The maximum damper blade width shall be 12 inches. Larger sized dampers shall be built using a combination of sections.

Frames shall be at least 2 inches wide. Flat blades shall have edges folded for rigidity. Blades shall be provided with compressible gasket seals along the full length of the blades to prevent air leakage when closed.

The damper frames shall be provided with jamb seals to minimize air leakage. Seals shall be suitable for an operating temperature range of minus 40 degrees F to 200 degrees F.

The leakage rate of each damper when full-closed shall be no more than 4 cfm per sq. foot of damper face area at 1.0 inches water gage static pressure.

2.3.2 Control Valves

2.3.2.1 Valve Assembly

Valve bodies shall be designed for 125 psig minimum working pressure or 150 percent of the operating pressure, whichever is greater. Valve stems shall be Type 316 stainless steel. Valve leakage ratings shall be 0.01 percent of rated Cv value. Class 125 copper alloy valve bodies and Class 150 steel or stainless steel valves shall meet the requirements of ASME B16.5. Cast iron valve components shall meet the requirements of ASTM A 126 Class B or C.

2.3.2.2 Butterfly Valves

Butterfly valves shall be the threaded lug type suitable for dead-end service and for modulation to the fully-closed position, with stainless steel shafts supported by bearings, non-corrosive discs geometrically interlocked with or bolted to the shaft (no pins), and EPDM seats suitable for temperatures from minus 20 degrees F to plus 250 degrees F. Valves shall have a means of manual operation independent of the actuator.

2.3.2.3 Two-Way Valves

Two-way modulating valves shall have an equal percentage characteristic.

2.3.2.4 Three-Way Valves

Three-way valves shall have an equal percentage characteristic.

2.3.2.5 Valves for Chilled Water, Condenser Water, and Glycol Fluid Service

a. Bodies for valves 1-1/2 inches and smaller shall be brass or bronze, with threaded or union ends. Bodies for valves from 2 inches to 3 inches inclusive shall be of brass, bronze, or iron. Bodies for 2 inch valves shall have threaded connections. Bodies for valves from 2-1/2 to 3 inches shall have flanged connections.

b. Internal valve trim shall be brass or bronze, except that valve stems shall be stainless steel.

c. Unless indicated otherwise, provide modulating valves sized for 2 psi minimum and 4 psi maximum differential across the valve at the design flow rate.

d. Valves 4 inches and larger shall be butterfly valves, unless indicated otherwise.

2.3.2.6 Valves for Hot Water Service

Valves for hot water service below 250 Degrees F:

a. Bodies for valves 1-1/2 inches and smaller shall be brass or bronze, with threaded or union ends. Bodies for valves from 2 inches to 3 inches inclusive shall be of brass, bronze, or iron. Bodies for 2 inch valves shall have threaded connections. Bodies for valves from 2-1/2 to 3 inches shall have flanged connections.

b. Internal trim (including seats, seat rings, modulation plugs, valve stems, and springs) of valves controlling water above 210 degrees F shall be Type 316 stainless steel.

c. Internal trim for valves controlling water 210 degrees F or less shall be brass or bronze. Valve stems shall be Type 316 stainless steel.

d. Non-metallic parts of hot water control valves shall be suitable for a minimum continuous operating temperature of 250 degrees F or 50 degrees F above the system design temperature, whichever is higher.

e. Unless indicated otherwise, provide modulating valves sized for 2 psi minimum and 4 psi maximum differential across the valve at the design flow rate.

f. Valves 4 inches and larger shall be butterfly valves, unless indicated otherwise.

2.3.2.7 Valves for High Temperature Hot Water Service

Valves for hot water service 250 Degrees F above:

a. Valve bodies shall conform to ASME B16.34 Class 300. Valve and actuator combination shall be normally closed. Bodies shall be carbon steel, globe type with welded ends on valves 1 inch and larger. Valves smaller than 1 inch shall have socket-weld ends. Packing shall be virgin polytetrafluoroethylene (PTFE).

b. Internal valve trim shall be Type 316 stainless steel.

c. Unless indicated otherwise, provide modulating valves sized for 2 psi minimum and 4 psi maximum differential across the valve at the design flow rate.

2.3.2.8 Valves for Steam Service

The entire body for valves 1-1/2 inches and smaller shall be brass or

bronze, with threaded or union ends. Bodies for valves from 2 to 3 inches inclusive shall be of brass, bronze, or carbon steel. Bodies for valves 4 inches and larger shall be carbon steel. Bodies for 2 inch valves shall have threaded connections. Bodies for valves 2-1/2 inches and larger shall have flanged connections. Steam valves shall be sized for [15 psig] [_____] inlet steam pressure with a maximum [13 psi] [_____] differential through the valve at rated flow, except where indicated otherwise. Internal valve trim shall be Type 316 stainless steel.

2.3.3 Actuators

Provide direct-drive electric actuators for all control applications, except where indicated otherwise.

2.3.3.1 Electric Actuators

Each actuator shall deliver the torque required for continuous uniform motion and shall have internal end switches to limit the travel, or be capable of withstanding continuous stalling without damage. Actuators shall function properly within 85 to 110 percent of rated line voltage. Provide actuators with hardened steel running shafts and gears of steel or copper alloy. Fiber or reinforced nylon gears may be used for torques less than 16 inch-pounds. Provide two-position actuators of single direction, spring return, or reversing type. Provide modulating actuators capable of stopping at any point in the cycle, and starting in either direction from any point. Actuators shall be equipped with a switch for reversing direction, and a button to disengage the clutch to allow manual adjustments. Provide the actuator with a hand crank for manual adjustments, as applicable. Thermal type actuators may only be used on terminal fan coil units, terminal VAV units, convectors, and unit heaters. Spring return actuators shall be provided on all control dampers and all control valves except terminal fan coil units, terminal VAV units, convectors, and unit heaters; unless indicated otherwise. Each actuator shall have distinct markings indicating the full-open and full-closed position, and the points in-between.

2.3.3.2 Pneumatic Actuators

Provide piston or diaphragm type actuators

2.3.4 Output Signal Conversion

2.3.4.1 Electronic-to-Pneumatic Transducers

Electronic to pneumatic transducers shall convert a 4 to 20 mA or 0 to 10 VDC digital controller output signal to a proportional 0 to 20 psig pressure signal (operator scaleable). Accuracy and linearity shall be 1.0 percent or better. [Transducers shall have feedback circuit that converts the pneumatic signal to a proportional 4 to 20 mA or 0 to 10 VDC signal.]

2.3.5 Output Switches

2.3.5.1 Control Relays

Field installed and DDC panel relays shall be double pole, double throw, UL listed, with contacts rated for the intended application, indicator light, and dust proof enclosure. The indicator light shall be lit when the coil is energized and off when coil is not energized. Relays shall be the socket type, plug into a fixed base, and replaceable without tools or

removing wiring. Encapsulated "PAM" type relays may be used for terminal control applications.

2.4 ELECTRICAL POWER AND DISTRIBUTION

2.4.1 Transformers

Transformers shall conform to UL 506. For control power other than terminal level equipment, provide a fuse or circuit breaker on the secondary side of each transformer.

2.4.2 Surge and Transient Protection

Provide each digital controller with surge and transient power protection. Surge and transient protection shall consist of the following devices, installed externally to the controllers.

2.4.2.1 Power Line Surge Protection

Provide surge suppressors on the incoming power at each controller or grouped terminal controllers. Surge suppressors shall be rated in accordance with UL 1449, have a fault indicating light, and conform to the following:

a. The device shall be a transient voltage surge suppressor, hard-wire type individual equipment protector for 120 VAC/1 phase/2 wire plus ground.

b. The device shall react within 5 nanoseconds and automatically reset.

c. The voltage protection threshold, line to neutral, shall be no more than 211 volts.

d. The device shall have an independent secondary stage equal to or greater than the primary stage joule rating.

e. The primary suppression system components shall be pure silicon avalanche diodes.

f. The secondary suppression system components shall be silicon avalanche diodes or metal oxide varistors.

g. The device shall have an indication light to indicate the protection components are functioning.

h. All system functions of the transient suppression system shall be individually fused and not short circuit the AC power line at any time.

i. The device shall have an EMI/RFI noise filter with a minimum attenuation of 13 dB at 10 kHz to 300 MHz.

j. The device shall comply with IEEE C62.41.1 and IEEE C62.41.2, Class "B" requirements and be tested according to IEEE C62.45.

k. The device shall be capable of operating between minus 20 degrees F and plus 122 degrees F.

2.4.2.2 Telephone and Communication Line Surge Protection

Provide surge and transient protection for DDC controllers and DDC network related devices connected to phone and network communication lines, in accordance with the following:

a. The device shall provide continuous, non-interrupting protection, and shall automatically reset after safely eliminating transient surges.

b. The protection shall react within 5 nanoseconds using only solid-state silicon avalanche technology.

c. The device shall be installed at the distance recommended by its manufacturer.

2.4.2.3 Controller Input/Output Protection

Provide controller inputs and outputs with surge protection via optical isolation, metal oxide varistors (MOV), or silicon avalanche devices. Fuses are not permitted for surge protection.

2.4.3 Wiring

Provide complete electrical wiring for the DDC System, including wiring to transformer primaries. Unless indicated otherwise, provide all normally visible or otherwise exposed wiring in conduit. Where conduit is required, control circuit wiring shall not run in the same conduit as power wiring over 100 volts. [Circuits operating at more than 100 volts shall be in accordance with Section 26 20 00, INTERIOR DISTRIBUTION SYSTEM.] Run all circuits over 100 volts in conduit, metallic tubing, covered metal raceways, or armored cable. Use plenum-rated cable for circuits under 100 volts in enclosed spaces. Examples of these spaces include HVAC plenums, within walls, above suspended ceilings, in attics, and within ductwork.

2.4.3.1 Power Wiring

The following requirements are for field-installed wiring:

a. Wiring for 24 V circuits shall be insulated copper 18 AWG minimum and rated for 300 VAC service.

b. Wiring for 120 V circuits shall be insulated copper 14 AWG minimum and rated for 600 VAC service.

2.4.3.2 Analog Signal Wiring

Field-installed analog signal wiring shall be 18 AWG single or multiple twisted pair. Each cable shall be 100 percent shielded and have a 20 AWG drain wire. Each wire shall have insulation rated for 300 VAC service. Cables shall have an overall aluminum-polyester or tinned-copper cable-shield tape.

2.5 FIRE PROTECTION DEVICES

2.5.1 Duct Smoke Detectors

Provide duct smoke detectors in HVAC ducts in accordance with NFPA 72 and NFPA 90A, except as indicated otherwise. Provide UL listed or FM approved detectors, designed specifically for duct installation.

[Furnish detectors under Section 28 31 74.00 20 INTERIOR FIRE DETECTION AND ALARM SYSTEM and install under this section. Connect new detectors to the building fire alarm panel.]

[Provide [ionization] [or] [photoelectric] type detectors. Detectors shall detect both visible and invisible particles of combustion, and shall not be susceptible to undesired operation by changes to relative humidity. Provide each detector with an approved duct housing mounted exterior to the duct, and an integral perforated sampling tube extending across the width of the duct. The detector housing shall have indicator lamps that light when the detector is powered and when the detector is activated. Each detector shall have an integral test port [, test switch] [and] [or] [, remote keyed test device]. Connect new detectors to the building's [new] [existing] fire alarm control panel. Provide control and power modules required for the operation of the detectors [in their own new control unit] [or] [integral with the existing fire alarm panel]. A ground fault, break, or open condition in the electrical circuitry to any detector or its control or power unit shall cause activation of a trouble signal at the building fire alarm panel. Electrical supervision of wiring used exclusively for air-handling unit shutdown is not required, provided a break in the wiring would cause shutdown of the associated unit. Equipment and devices shall be compatible and operable in all respects with, and shall in no way impair the reliability or operational functions of, the [new] [existing] fire alarm system. [The building's existing fire alarm control panel was manufactured by [_____].] Provide descriptive zone labels at the [new] [existing] fire alarm panel indicating which new air-handling unit detectors they serve and their location. Label zones modified in order to accomplish the work.]

[Provide [ionization] [or] [photoelectric] type detectors. Detectors shall detect both visible and invisible particles of combustion, and shall not be susceptible to undesired operation by changes to relative humidity. Provide each detector with an approved duct housing mounted exterior to the duct, and an integral perforated sampling tube extending across the width of the duct. The detector housing shall have indicator lamps that light when the detector is powered and when the detector is activated. Each detector shall have an integral test port [, test switch] [and] [or] [, remote keyed test device]. Provide a 115 VAC power supply unit integral with the detector's duct housing. Provide power to the detector from [the air-handling unit or air-handling unit controls] [the location indicated]. [Provide the detectors with a remote alarm indicator [and keyed test] device at [_____] [the location indicated].] [Provide each detector with a minimum 6 inch diameter remote alarm bell located [as directed][as indicated] in a normally occupied area.] Activation of a detector shall cause immediate shutdown of the associated air-handling unit [and the closing of its dampers][and shall activate the remote alarm indicator][and shall sound the remote alarm bell]. [Provide the remote alarm bell with a permanent label indicating its associated air-handling unit and air-handling unit location.]]

[Provide smoke control systems with a provision for manual operation by

means of a key-operated switch to override the duct smoke detector shutdowns. Locate the override switch [adjacent to the building's fire alarm system control panel][as indicated].]

2.6 INDICATORS

2.6.1 Thermometers

Provide bi-metal type thermometers at locations shown. Thermometers shall have either 9 inch long scales or 3.5 inch diameter dials, with insertion, immersion, or averaging elements. Provide matching thermowells for pipe-mounted installations. Select scale ranges suitable for the intended service, with the normal operating temperature near the scale's midpoint. The thermometer's accuracy shall be plus or minus 2 percent of the scale range.

2.6.2 Pressure Gauges for Piping Systems

Provide pipe-mounted pressure gauges at the locations shown. Gauges shall conform to ASME B40.100 and have a 4-inch diameter dial and shutoff cock. Provide gauges in steam piping with a pressure snubber pigtail fitting. Select scale ranges suitable for the intended service, with the normal operating pressure near the scale's midpoint. The gauge's accuracy shall be plus or minus 2 percent of the scale range.

2.6.3 Pressure Gauges for Pneumatic Controls

Provide a pressure gauge at each pneumatic control input and output. Gauges shall have a 2-inch diameter face and a 0 to 30 psi scale with 1 psi graduations.

2.7 PNEUMATIC POWER SUPPLY AND TUBING

2.7.1 Air Compressors

Air compressors for pneumatic control systems shall be the tank-mounted, electric motor driven, air cooled, reciprocating type with integral [duplex motors and compressors][single motor and compressor], tank, controller, [alternator switch,]pressure switch, belt guard[s], pressure relief valve, and automatic moisture drain valve. Compressor piston speeds shall not exceed 450 fpm. Provide compressors with a dry-type combination intake air filter and silencer with baked enamel steel housing. The filter shall be 99 percent efficient at 10 microns. The pressure switch shall start the compressor[s] at 70 psig and stop the compressor[s] at 90 psig. The relief valve shall be set for 10 to 25 psig above the control switch cut-off pressure. Provide compressor capacity suitable for not more than a [33] [50] percent run time, at full system control load. Compressors shall have a maintaining type starter, and shall automatically restart after a power outage. Motors 0.5 hp and larger shall be three-phase.

2.7.1.1 Compressed Air Tank

Provide a steel tank constructed and labeled in agreement with ASME BPVC for 125 psig maximum working pressure. Size the tank for the compressor run time specified above. Provide drain valve and piping routing the drainage to a floor sink or other safe and visible drainage location.

2.7.2 Refrigerated Air Dryers

Provide each air compressor tank with a refrigerant air dryer sized for continuous operation, and capable of reducing the compressed air dew point temperature, at 20 psig output pressure, to 30 degrees F, at an average tank pressure of 80 psig and an ambient air temperature between 55 and 95 degrees F. Provide each dryer with an automatic condensate drain trap with manual override feature. Provide the dryer suction line with a refrigerant pressure gauge. Locate each dryer in the air piping between the tank and the pressure-reducing station.

2.7.3 Compressed Air Discharge Filters

Provide air compressors with a dry type discharge filter, 99 percent efficient at removing oil and solid particles at 0.03 microns, with baked enamel steel housing and manual drain valve. Provide visual indicator to show when the filter element should be changed.

2.7.4 Air Pressure-Reducing Stations

Provide air compressors with a pressure-reducing valve (PRV) with a field adjustable range of 0 to 50 psig discharge pressure, at an inlet pressure of 70 to 90 psig. Provide a factory-set pressure relief valve downstream of the PRV to relieve over-pressure. Provide a pressure gage upstream of the PRV with range of 0 to 100 psig and downstream of the PRV with range of 0 to 30 psig. For two-pressure control systems, provide an additional PRV and downstream pressure gage.

2.7.5 In-line Filters

Provide a disposable type in-line filter in the incoming pneumatic main at each pneumatic control panel. The filter shall be capable of eliminating 99.99 percent of all liquid or solid contaminants 0.1 micron or larger. Provide the filter with fittings that allow easy removal/replacement.

2.7.6 Pneumatic Tubing

2.7.6.1 Copper Tubing

Provide ASTM B 75 or ASTM B 88 rated tubing. Tubing 0.375 inch outside diameter and larger shall have minimum wall thickness equal to ASTM B 88, Type M. Tubing less than 0.375 inch outside diameter shall have minimum wall thickness of 0.025 inch. Exposed tubing and tubing for working pressures greater than 30 psig shall be hard copper. Fittings shall be ASME B16.18 or ASME B16.22 solder type using ASTM B 32 95-5 tin-antimony solder, or ASME B16.26 compression type.

2.7.6.2 Polyethylene Tubing

Polyethylene tubing may only be used in systems with working pressure of 30 psig or less. Provide flame-resistant, multiple polyethylene tubing in flame-resistant protective sheath with mylar barrier, or unsheathed polyethylene tubing in rigid metal, intermediate metal, or electrical metallic tubing conduit for areas where tubing is exposed. Single, unsheathed, flame-resistant polyethylene tubing may be used where concealed in walls or above ceilings and within control panels. Do not provide polyethylene tubing for [systems indicated as critical and] smoke removal systems. Provide compression or brass barbed push-on type fittings. Extruded seamless polyethylene tubing shall conform to the following:

a. Minimum Burst Pressure Requirements: 100 psig at 75 degrees F to 25 psig at 150 degrees F.

b. Stress Crack Resistance: ASTM D 1693, 200 hours minimum.

c. Tensile Strength (Minimum): ASTM D 638, 1100 psi.

d. Flow Rate (Average): ASTM D 1238, 0.30 decigram per minute.

e. Density (Average): ASTM D 792, 57.5 pounds per cubic feet.

f. Burn rate: ASTM D 635

2.8 VARIABLE FREQUENCY (MOTOR) DRIVES

Provide variable frequency drives (VFDs) as indicated. VFDs shall convert 240 or 460 volt (plus or minus 10 percent), three phase, 60 hertz (plus or minus 2Hz), utility grade power to adjustable voltage/frequency, three phase, AC power for stepless motor control from 5 percent to 105 percent of base speed. VFDs shall be UL listed as delivered to the end user. The VFD shall meet the requirements specified in the most current National Electrical Code. Each VFD shall also meet the following:

a. The VFD shall use sine coded Pulse Width Modulation (PWM) technology. PWM calculations shall be performed by the VFD microprocessor.

b. The VFD shall be capable of automatic control by a remote 4-20 mA [0 to 10 VDC] signal, by network command, or manually by the VFD control panel.

2.8.1 VFD Quality Assurance

VFDs shall be the manufacturer's current standard production unit with at least 10 identical units successfully operating in the field.

2.8.2 VFD Service Support

a. Warranty: Provide the VFDs with a minimum 24-month full parts and labor warranty. The warranty shall start when the contract's HVAC system is accepted by the Government. Include warranty documentation, dates, and contact information with the VFD on-site service manuals.

b. VFD Service Manuals: Provide the VFDs with all necessary installation, operation, maintenance, troubleshooting, service, and repair manuals in English including related factory technical bulletins. Provide the documents factory bound, in sturdy 3-ring binders, or hard bound covers. Provide a title sheet on the outside of each binder indicating the project title, project location, installing contractor, contract number, and the VFD manufacturer, address, and telephone number. Each binder shall include a table of contents and tabbed dividers, with all material neatly organized. The documentation provided shall be specifically applicable to this project, shall be annotated to reflect the actual project conditions, and shall provide a complete and concise depiction of the installed work.[Provide a storage cabinet on or near the VFD large enough to hold all of the documentation. Have the cabinet's proposed installation site approved in advance by the Contracting Officer. Prominently label the cabinet "VFD OPERATION AND MAINTENANCE MANUALS." Clearly label each manual with the wording

"MECHANICAL ROOM COPY - DO NOT REMOVE".]

c. Technical Support: Provide the VFDs with manufacturer's technical telephone support in English, readily available during normal working hours, and free of charge for the life of the equipment.

d. Initial Start-Up: Provide the VFDs with factory-trained personnel for the on-site start-up of the HVAC equipment and associated VFD. The personnel shall be competent in the complete start-up, operation, and repair of the particular model VFD installed. The factory start-up representative shall perform the factory's complete recommended start-up procedures and check-out tests on the VFD. Include a copy of the start-up test documentation with the VFD on-site service manuals.

e. Provide the VFDs with on-site/hands-on training for the user and maintenance personnel. Provide a capable and qualified instructor with minimum two years field experience with the operation and maintenance of similar VFDs. The training shall occur during normal working hours and last not less than 2 hours. Coordinate the training time with the Contracting Officer and the end user. The VFD service manuals shall be used during the training. The contractor shall ensure the manuals are on-site before the start of training. The training shall cover all operational aspects of the VFD.

2.8.3 VFD Features

VFDs shall have the following features:

a. A local operator control keypad capable of:

(1) Remote/Local operator selection with password access.

(2) Run/Stop and manual speed commands.

(3) All programming functions.

(4) Scrolling through all display functions.

b. Digital display capable of indicating:

(1) VFD status.

(2) Frequency.

(3) Motor RPM.

(4) Phase current.

(5) Fault diagnostics in descriptive text.

(6) All programmed parameters.

c. Standard PI loop controller with input terminal for controlled variable and parameter settings.

d. User interface terminals for remote control of VFD speed, speed feedback, and an isolated form C SPDT relay, which energizes on a drive fault condition.

e. An isolated form C SPDT auxiliary relay which energizes on a run command.

f. A metal NEMA 1 enclosure for indoors, NEMA 4 with heater for outdoors.

g. An adjustable carrier frequency with 16 KHz minimum upper limit.

h. A built in or external line reactor with 3 percent minimum impedance to protect the VFDs DC buss capacitors and rectifier section diodes.

2.8.4 Programmable Parameters

VFDs shall include the following operator programmable parameters:

a. Upper and lower limit frequency.

b. Acceleration and Deceleration rate.

c. Variable torque volts per Hertz curve.

d. Starting voltage level.

e. Starting frequency level.

f. Display speed scaling.

g. Enable/disable auto-restart feature.

h. Enable/disable soft stall feature.

i. Motor overload level.

j. Motor stall level.

k. Jump frequency and hysteresis band.

l. PWM carrier frequency.

2.8.5 Protective Features

VFDs shall have the following protective features:

a. An electronic adjustable inverse time current limit with consideration for additional heating of the motor at frequencies below 45Hz, for the protection of the motor.

b. An electronic adjustable soft stall feature, allowing the VFD to lower the frequency to a point where the motor will not exceed the full-load amperage when an overload condition exists at the requested frequency. The VFD will automatically return to the requested frequency when load conditions permit.

c. A separate electronic stall at 110 percent VFD rated current, and a separate hardware trip at 190 percent current.

d. Ground fault protection that protects the output cables and motor from grounds during both starting and continuous running conditions.

e. The ability to restart after the following faults:

(1) Overcurrent (drive or motor).

(2) Power outage.

(3) Phase loss.

(4) Over voltage/Under voltage.

f. The ability shut down if inadvertently started into a rotating load without damaging the VFD or the motor.

g. The ability to keep a log of a minimum of four previous fault conditions, indicating the fault type and time of occurrence in descriptive text.

h. The ability to sustain 110 percent rated current for 60 seconds

i. The ability to shutdown safely or protect against and record the following fault conditions:

(1) Over current (and an indication if the over current was during acceleration, deceleration, or running).

(2) Over current internal to the drive.

(3) Motor overload at start-up.

(4) Over voltage from utility power.

(5) Motor running overload.

(6) Over voltage during deceleration.

(7) VFD over heat.

(8) Load end ground fault.

(9) Abnormal parameters or data in VFD EEPROM.

2.8.6 Minimum Operating Conditions

VFDs shall be designed and constructed to operate within the following service conditions:

a. Ambient Temperature Range, 0 to 120 degrees F.

b. Non-condensing relative humidity to 90 percent.

2.8.7 Additional Features

Provide VFDs with the following additional features:

[a. BACnet communication interface port]

[b. RFI/EMI filters]

[c. Manual bypass circuit and switch integral [external] to the drive to allow drive bypass and operation at 100 percent speed. Motor overload

and short circuit protective features shall remain in use during the bypass mode.]

[d. One spare VFD of each model provided, fully programmed and ready for back-up operation when connected.]

PART 3 EXECUTION

3.1 INSTALLATION

Perform the installation under the supervision of competent technicians regularly employed in the installation of DDC systems.

3.1.1 BACnet Naming and Addressing

Coordinate with the BAS Owner and provide unique naming and addressing for BACnet networks and devices.

a. MAC Address

Every BACnet device shall have an assigned and documented MAC Address unique to its network. For Ethernet networks, document the MAC Address assigned at its creation. For ARCNET or MS/TP, assign from 00 to 64.

b. Network Numbering

Assign unique numbers to each new network installed on the BACnet internetwork. Provide ability for changing the network number; either by device switches, network computer, or field operator interface. The BACnet internetwork (all possible connected networks) can contain up to 65,534 possible unique networks.

c. Device Object Identifier Property Number

Assign unique Device "Object_Identifier" property numbers or device instances for each device on the BACnet internetwork. Provide for future modification of the device instance number; either by device switches, network computer, or field interface. BACnet allows up to 4,194,302 possible unique devices per internetwork.

d. Device Object Name Property Text

The Device Object Name property field shall support 32 minimum printable characters. Assign unique Device "Object_Name" property names with plain-English descriptive names for each device
For example, the Device Object Name that for the device controlling the chiller plant at Building 3408 would be:

Device Object_Name = CW System B3408

A Device Object Name for a VAV box controller might be:

Device Object_Name = VAV BOX25

e. Object Name Property Text (Other than Device Objects)

The Object Name property field shall support 32 minimum printable characters. Assign Object Name properties with plain-English names descriptive of the application. Examples include "Zone 1 Temperature"

and "Fan Start/Stop".

f. Object Identifier Property Number (Other than Device Objects)

Assign Object Identifier property numbers according to design drawings or tables if provided. If not provided, Object Identifier property numbers may be assigned at the Contractor's discretion but must be approved by the Government. In this case they must be documented and unique for like object types within the device.

3.1.2 Minimum BACnet Object Requirements

a. Use of Standard BACnet Objects

For the following points and parameters, use standard BACnet objects, where all relevant object properties can be read using BACnet's Read Property Service, and all relevant object properties can be modified using BACnet's Write Property Service:
all device physical inputs and outputs, all set points, all PID tuning parameters, all calculated pressures, flow rates, and consumption values, all alarms, all trends, all schedules, and all equipment and lighting circuit operating status.

b. BACnet Object Description Property

The Object Description property shall support 32 minimum printable characters. For each object, complete the description property field using a brief, narrative, plain English description specific to the object and project application. For example: "HW Pump 1 Proof." Document compliance, length restrictions, and whether the description is writeable in the device PICS.

c. Analog Input, Output, and Value Objects

Support and provide Description and/or Device_Type text strings matching signal type and engineering units shown on the points list.

d. Binary Input, Output, and Value Objects

Support and provide Inactive_Text and Active_Text property descriptions matching conditions shown on the points list.

e. Calendar Object

For devices with scheduling capability, provide at least one Calendar Object with ten-entry capacity. All operators may view Calendar Objects; authorized operators may make modifications from a workstation. Enable the writeable Date List property and support all calendar entry data types.

f. Schedule Object

Use Schedule Objects for all building system scheduling. All operators may view schedule entries; authorized operators may modify schedules from a workstation.

g. Loop Object or Equal

Use Loop Objects or equivalent BACnet objects in each applicable field

device for PID control. Regardless of program method or object used, allow authorized operators to adjust the Update Interval, Setpoint, Proportional Constant, Integral Constant, and Derivative Constant using BACnet read/write services.

3.1.3 Minimum BACnet Service Requirements

a. Command Priorities

Use commandable BACnet objects to control machinery and systems, providing the priority levels listed below. If the sequence of operation requires a different priority, obtain approval from the Contracting Officer.

Priority Level	Application
1	Manual-Life Safety
2	Automatic-Life Safety
3	(User Defined)
4	(User Defined)
5	Critical Equipment Control
6	Minimum On/Off
7	(User Defined)
8	Manual Operator
9	(User Defined)
10	(User Defined)
11	Load Shedding
12	(User Defined)
13	(User Defined)
14	(User Defined)
15	(User Defined)
16	(User Defined)

b. Alarming

(1) Alarm Priorities - Coordinate alarm and event notification with the BAS Owner.

(2) Notification Class - Enable writeable Priority, Ack Required, and Recipient List properties of Notification Class objects.

(3) Event Notification Message Texts - Use condition specific narrative text and numerical references for alarm and event notification.

c. Updating Displayed Property Values

Allow workstations to display property values at discrete polled intervals, or based on receipt of confirmed and unconfirmed Change of Value notifications. The COV increment shall be adjustable by an operator using BACnet services, and polled intervals shall be adjustable at the operator workstation.

3.1.4 Local Area Networks

Obtain Government approval before connecting new networks with existing networks. Network numbers and device instance numbers shall remain unique when joining networks. Do not change existing network addressing without Government approval. See also "BACnet Naming and Addressing".

3.1.5 BACnet Routers, Bridges, and Switches

Provide the quantity of BACnet routers, bridges, and switches necessary for communications shown on the BACnet Communication Architecture schematic. Provide BACnet routers with BACnet Broadcast Message Device (BBMD) capability on each BACnet internetwork communicating across an IP network. Configure each BACnet device and bridge, router, or switch to communicate on its network segment.

3.1.6 Wiring Criteria

a. Run circuits operating at more than 100 volts in rigid or flexible conduit, metallic tubing, covered metal raceways, or armored cable.

b. Do not run binary control circuit wiring in the same conduit as power wiring over 100 volts. Where analog signal wiring requires conduit, do not run in the same conduit with AC power circuits or control circuits operating at more than 100 volts.

c. Provide circuit and wiring protection required by NFPA 70.

d. Run all wiring located inside mechanical rooms in conduit.

e. Do not bury aluminum-sheathed cable or aluminum conduit in concrete.

f. Input/output identification: Permanently label each field-installed wire, cable, and pneumatic tube at each end with descriptive text using a commercial wire marking system that fully encircles the wire, cable, or tube. Locate the markers within 2 inches of each termination. Match the names and I/O number to the project's point list. Similarly label all power wiring serving control devices, including the word "power" in the label. Number each pneumatic tube every six feet. Label all terminal blocks with alpha/numeric labels. All wiring and the wiring methods shall be in accordance with UL 508A.

g. For controller power, provide new 120 VAC circuits, with ground. Provide each circuit with a dedicated breaker, and run wiring in its own conduit, separate from any control wiring. Connect the controller's ground wire to the electrical panel ground; conduit grounds are not acceptable.

h. Surge Protection: Install surge protection according to manufacturer's instructions. Multiple controllers fed from a common power supply may be protected by a common surge protector, properly sized for the total connected devices.

i. Grounding: Ground controllers and cabinets to a good earth ground as specified in Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM. Conduit grounding is not acceptable; all grounding shall have a direct path to the building earth ground. Ground sensor drain wire shields at the controller end.

j. The Contractor shall be responsible for correcting all associated ground loop problems.

k. Run wiring in panel enclosures in covered wire track.

3.1.7 Accessibility

Install all equipment so that parts requiring periodic inspection, operation, maintenance, and repair are readily accessible. Install digital controllers, data ports, and concealed actuators, valves, dampers, and like equipment in locations freely accessible through access doors.

3.1.8 Digital Controllers

a. Install as stand alone control devices (see definitions).

b. Locate control cabinets at the locations shown on the drawings. If not shown on the drawings, install in the most accessible space, close to the controlled equipment.

3.1.9 Hand-Off-Auto Switches

Wire safety controls such as smoke detectors and freeze protection thermostats to protect the equipment during both hand and auto operation.

3.1.10 Temperature Sensors

Install temperature sensors in locations that are accessible and provide a good representation of sensed media. Installations in dead spaces are not acceptable. Calibrate sensors according to manufacturer's instructions. Do not use sensors designed for one application in a different application.

3.1.10.1 Room Temperature Sensors

Mount the sensors on interior walls to sense the average room temperature at the locations indicated. Avoid locations near heat sources such as copy machines or locations by supply air outlet drafts. Mount the center of the sensor [5 feet above the finished floor][54 inches above the floor to meet ADA requirements][at the height[s] indicated].

3.1.10.2 Duct Temperature Sensors

a. Probe Type: Provide a gasket between the sensor housing and the duct wall. Seal the duct penetration air tight. Seal the duct insulation penetration vapor tight.

b. Averaging Type (and coil freeze protection thermostats): Weave the capillary tube sensing element in a serpentine fashion perpendicular to the flow, across the duct or air handler cross-section, using durable non-metal supports. Prevent contact between the capillary and the duct or air handler internals. Provide a duct access door at the sensor location. The access door shall be hinged on the side, factory insulated, have cam type locks, and be as large as the duct will permit, maximum 18 by 18 inches. For sensors inside air handlers, the sensors shall be fully accessible through the air handler's access doors without removing any of the air handler's internals.

3.1.10.3 Immersion Temperature Sensors

Provide thermowells for sensors measuring piping, tank, or pressure vessel temperatures. Locate wells to sense continuous flow conditions. Do not install wells using extension couplings. Where piping diameters are smaller than the length of the wells, provide wells in piping at elbows to sense flow across entire area of well. Wells shall not restrict flow area

to less than 70 percent of pipe area. Increase piping size as required to avoid restriction. Provide thermal conductivity material within the well to fully coat the inserted sensor.

3.1.10.4 Outside Air Temperature Sensors

Provide outside air temperature sensors in weatherproof enclosures on the north side of the building, away from exhaust hoods and other areas that may affect the reading. Provide a shield to shade the sensor from direct sunlight.

3.1.11 Energy Meters

Locate energy meters as indicated. Connect each meter output to the DDC system, to measure both instantaneous and accumulated energy usage.

3.1.12 Damper Actuators

Where possible, mount actuators outside the air stream in accessible areas.

3.1.13 Thermometers and Gages

Mount devices to allow reading while standing on the floor or ground, as applicable.

3.1.14 Pressure Sensors

Locate pressure sensors as indicated.

[3.1.15 Pneumatic Tubing

Run tubing concealed in finished areas, run tubing exposed in unfinished areas like mechanical rooms. For tubing enclosed in concrete, provide rigid metal conduit. Run tubing parallel and perpendicular to building walls. Use 5 foot maximum spacing between tubing supports. With the compressor turned off, test each tubing system pneumatically at 1.5 times the working pressure and prove it air tight, locating and correcting leaks as applicable. Caulking joints is not permitted. Do not run tubing and electrical power conductors in the same conduit.]

3.1.16 Component Identification Labeling

Using an electronic hand-held label maker with white tape and bold black block lettering, provide an identification label on the exterior of each new control panel, control device, actuator, and sensor. Also provide labels on the exterior of each new control actuator indicating the (full) open and (full) closed positions. For labels located outdoors, use exterior grade label tape, and provide labels on both the inside and outside of the panel door or device cover. Acceptable alternatives are white plastic labels with engraved bold black block lettering permanently attached to the control panel, control device, actuator, and sensor. Have the labels and wording approved by the BAS Owner prior to installation.

3.1.17 Network and Telephone Communication Lines

When telephone lines or network connections by the Government are required, provide the Contracting Officer at least 60 days advance notice of need.

3.2 TEST AND BALANCE SUPPORT

The controls contractor shall coordinate with and provide on-site support to the test and balance (TAB) personnel [specified under Section 23 05 93 TESTING, ADJUSTING AND BALANCING.] This support shall include:

a. On-site operation and manipulation of control systems during the testing and balancing.

b. Control setpoint adjustments for balancing all relevant mechanical systems, including VAV boxes.

c. Tuning control loops with setpoints and adjustments determined by TAB personnel.

3.3 CONTROLS SYSTEM OPERATORS MANUALS

Provide two [three] [four] electronic and printed copies of a Controls System Operators Manual. The manual shall be specific to the project, written to actual project conditions, and provide a complete and concise depiction of the installed work. Provide information in detail to clearly explain all operation requirements for the control system.

Provide with each manual: CDs of the project's control system drawings, control programs, data bases, graphics, and all items listed below. Include gateway back-up data and configuration tools where applicable. Provide CDs in jewel case with printed and dated project-specific labels on both the CD and the case. For text and drawings, use Adobe Acrobat or MS Office file types. When approved by the Government, AutoCAD and Visio files are allowed. Give files descriptive English names and organize in folders.

Provide printed manuals in sturdy 3-ring binders with a title sheet on the outside of each binder indicating the project title, project location, contract number, and the controls contractor name, address, and telephone number. Each binder shall include a table of contents and tabbed dividers, with all material neatly organized. Manuals shall include the following:

a. A copy of the as-built control system (shop) drawings set, with all items specified under the paragraph "Submittals." Indicate all field changes and modifications.

b. A copy of the project's mechanical design drawings, including any official modifications and revisions.

c. A copy of the project's approved Product Data submittals provided under the paragraph "Submittals."

d. A copy of the project's approved Performance Verification Testing Plan and Report.

e. A copy of the project's approved final TAB Report.

f. Printouts of all control system programs, including controller setup pages if used. Include plain-English narratives of application programs, flowcharts, and source code.

g. Printouts of all physical input and output object properties, including tuning values, alarm limits, calibration factors, and set points.

h. A table entitled "AC Power Table" listing the electrical power source for each controller. Include the building electrical panel number, panel location, and circuit breaker number.

i. The DDC manufacturer's hardware and software manuals in both print and CD format with printed project-specific labels. Include installation and technical manuals for all controller hardware, operator manuals for all controllers, programming manuals for all controllers, operator manuals for all workstation software, installation and technical manuals for the workstation and notebook, and programming manuals for the workstation and notebook software.

j. A list of qualified control system service organizations for the work provided under this contract. Include their addresses and telephone numbers.

k. A written statement entitled "Technical Support" stating the control system manufacturer or authorized representative will provide toll-free telephone technical support at no additional cost to the Government for a minimum of two years from project acceptance, will be furnished by experienced service technicians, and will be available during normal weekday working hours. Include the toll-free technical support telephone number.

l. A written statement entitled "Software Upgrades" stating software and firmware patches and updates will be provided upon request at no additional cost to the Government for a minimum of two years from contract acceptance. Include a table of all DDC system software and firmware provided under this contract, listing the original release dates, version numbers, part numbers, and serial numbers.

[3.3.1 Storage Cabinets

In each project mechanical room, provide a wall-mounted metal storage cabinet with hinged doors. In addition to the number of manuals specified above, provide an additional copy of the manuals in each of these mechanical room storage cabinets. Provide cabinets large enough to hold the entire set of Controls System Operators Manuals, and the HVAC operation and maintenance manuals [provided under Division 15 MECHANICAL.] Locate cabinets adjacent to DDC control panels where applicable. Have each cabinet's proposed installation site approved in advance by the Contracting Officer and the BAS Owner. Prominently label each cabinet with the wording "OPERATION AND MAINTENANCE MANUALS." Prominently label each binder with the wording "MECHANICAL ROOM COPY - DO NOT REMOVE."]

3.4 PERFORMANCE VERIFICATION TESTING (PVT)

3.4.1 General

The PVT shall demonstrate compliance of the control system work with the contract requirements. The PVT shall be performed by the Contractor and witnessed and approved by the Government. If the project is phased, provide separate testing for each phase. A Pre-PVT meeting to review the Pre-PVT Checklist is required to coordinate all aspects of the PVT and shall include the Contractor's QA representative, the Contractor's PVT administrator, the Contracting Officer's representative,[and the BAS Owner].

3.4.2 Performance Verification Testing Plan

Submit a detailed PVT Plan of the proposed testing for Government approval. Develop the PVT Plan specifically for the control system in this contract. The PVT Plan shall be an clear list of test items arranged in a logical sequence. Include the intended test procedure, the expected response, and the pass/fail criteria for every component tested.

The plan shall clearly describe how each item is tested, indicate where assisting personnel are required (like the mechanical contractor), and include what procedures are used to simulate conditions. Include a separate column for each checked item and extra space for comments. Where sequences of operations are checked, insert each corresponding routine from the project’s sequence of operation. For each test area, include signature and date lines for the Contractor's PVT administrator, the Contractor's QA representative, the Contracting Officer's representative,[and the BAS Owner] to acknowledge successful completion. [The BAS Owner can provide sample PVT forms and procedures upon request.]

3.4.3 PVT Sample Size

Test all central plant equipment and primary air handling unit controllers unless otherwise directed. Twenty percent sample testing is allowed for identical controllers typical of terminal control like VAV boxes and fan coil units. The Government may require testing of like controllers beyond a statistical sample if sample controllers require retesting or do not have consistent results.

The Government may witness all testing, or random samples of PVT items. When only random samples are witnessed, the Government may choose which ones.

3.4.4 Pre-Performance Verification Testing Checklist

Submit the following as a list with items checked off once verified. Provide a detailed explanation for any items that are not completed or verified.

a. Verify all required mechanical installation work is successfully completed, and all HVAC equipment is working correctly (or will be by the time the PVT is conducted).

b. Verify HVAC motors operate below full-load amperage ratings.

c. Verify all required control system components, wiring, and accessories are installed.

d. Verify the installed control system architecture matches approved drawings.

e. Verify all control circuits operate at the proper voltage and are free from grounds or faults.

f. Verify all required surge protection is installed.

g. Verify the A/C Power Table specified in "CONTROLS SYSTEM OPERATORS MANUALS" is accurate.

h. Verify all DDC network communications function properly, including

uploading and downloading programming changes.

i. Using the BACnet protocol analyzer (if provided or required in this specification), verify communications are error free.

j. Verify each digital controller's programming is backed up.

k. Verify all wiring, components, and panels are properly labeled.

l. Verify all required points are programmed into devices.

m. Verify all TAB work affecting controls is complete.

n. Verify all valve and actuator zero and span adjustments are set properly.

o. Verify all sensor readings are accurate and calibrated.

p. Verify each control valve and actuator goes to normal position upon loss of power.

q. Verify all control loops are tuned for smooth and stable operation. View trend data where applicable.

r. Verify each controller works properly in stand-alone mode.

s. Verify all safety controls and devices function properly, including freeze protection and interfaces with building fire alarm systems.

t. Verify all electrical interlocks work properly.

u. Verify all workstations, notebooks and maintenance personnel interface tools are delivered, all system and database software is installed, and graphic pages are created for each workstation and notebook.

v. Verify the as-built (shop) control drawings are completed.

3.4.5 Conducting Performance Verification Testing

a. Conduct Government-witnessed PVT after approval of the PVT Plan and the completed Pre-PVT Checklist. Notify the Contracting Officer of the planned PVT at least 15 days prior to testing. Provide an estimated time table required to perform the testing. Furnish personnel, equipment, instrumentation, and supplies necessary to perform all aspects of the PVT. Ensure that testing personnel are regularly employed in the testing and calibration of DDC systems. Using the project's as-built control system (shop) drawings, the project's mechanical design drawings, the approved Pre-PVT Checklist, and the approved PVT Plan, conduct the PVT.

b. During testing, identify any items that do not meet the contract requirements and if time permits, conduct immediate repairs and re-test. Otherwise, deficiencies shall be investigated, corrected, and re-tested later. Document each deficiency and corrective action taken.

c. If re-testing is required, follow the procedures for the initial PVT. The Government may require re-testing of any control system components affected by the original failed test.

3.4.6 Controller Capability and Labeling

Test the following for each controller:

a. Memory: Demonstrate that programmed data, parameters, and trend/ alarm history collected during normal operation is not lost during power failure.

b. Direct Connect Interface: Demonstrate the ability to connect directly to each type of digital controller with a portable electronic device like a notebook computer or PDA. Show that maintenance personnel interface tools perform as specified in the manufacturer's technical literature.

c. Stand Alone Ability: Demonstrate controllers provide stable and reliable stand-alone operation using default values or other method for values normally read over the network.

d. Wiring and AC Power: Demonstrate the ability to disconnect any controller safely from its power source using the AC Power Table. Demonstrate the ability to match wiring labels easily with the control drawings. Demonstrate the ability to locate a controller's location using the BACnet Communication Architecture Schematic and floor plans.

e. Nameplates and Tags: Show the nameplates and tags are accurate and permanently attached to control panel doors, devices, sensors, and actuators.

3.4.7 Workstation and Software Operation

For every user workstation or notebook provided:

a. Show points lists agree with naming conventions.

b. Show that graphics are complete.

c. Show the UPS operates as specified.

3.4.8 BACnet Communications and Interoperability Areas

Demonstrate proper interoperability of data sharing, alarm and event management, trending, scheduling, and device and network management. If available or required in this specification, use a BACnet protocol analyzer to assist with identifying devices, viewing network traffic, and verifying interoperability. These requirements must be met even if there is only one manufacturer of equipment installed. Testing includes the following:

a. Data Presentation: On each BACnet Operator Workstation, demonstrate graphic display capabilities.

b. Reading of Any Property: Demonstrate the ability to read and display any used readable object property of any device on the network.

c. Setpoint and Parameter Modifications: Show the ability to modify all setpoints and tuning parameters in the sequence of control or listed on project schedules. Modifications are made with BACnet messages and write services initiated by an operator using workstation graphics, or by completing a field in a menu with instructional text.

d. Peer-to-Peer Data Exchange: Show all BACnet devices are installed and configured to perform BACnet read/write services directly (without the need for operator or workstation intervention), to implement the project sequence of operation, and to share global data.

e. Alarm and Event Management: Show that alarms/events are installed and prioritized according to the BAS Owner. Demonstrate time delays and other logic is set up to avoid nuisance tripping, e.g., no status alarms during unoccupied times or high supply air during cold morning start-up. Show that operators with sufficient privilege can read and write alarm/event parameters for all standard BACnet event types. Show that operators with sufficient privilege can change routing (BACnet notification classes) for each alarm/event including the destination, priority, day of week, time of day, and the type of transition involved (TO-OFF NORMAL, TO-NORMAL, etc.).

f. Schedule Lists: Show that schedules are configured for start/stop, mode change, occupant overrides, and night setback as defined in the sequence of operations.

g. Schedule Display and Modification: Show the ability to display any schedule with start and stop times for the calendar year. Show that all calendar entries and schedules are modifiable from any connected workstation by an operator with sufficient privilege.

h. Archival Storage of Data: Show that data archiving is handled by the operator workstation/server, and local trend archiving and display is accomplished with BACnet Trend Log objects.

i. Modification of Trend Log Object Parameters: Show that an operator with sufficient privilege can change the logged data points, sampling rate, and trend duration.

j. Device and Network Management: Show the following capabilities:

(1) Display of Device Status Information

(2) Display of BACnet Object Information

(3) Silencing Devices that are Transmitting Erroneous Data

(4) Time Synchronization

(5) Remote Device Reinitialization

(6) Backup and Restore Device Programming and Master Database(s)

(7) Configuration Management of Half-Routers, Routers and BBMDs

3.4.9 Execution of Sequence of Operation

Demonstrate that the HVAC system operates properly through the complete sequence of operation. Use read/write property services to globally read and modify parameters over the internetwork.

3.4.10 Control Loop Stability and Accuracy

For all control loops tested, give the Government trend graphs of the control variable over time, demonstrating that the control loop responds to

a 20 percent sudden change of the control variable set point without excessive overshoot and undershoot. If the process does not allow a 20 percent set point change, use the largest change possible. Show that once the new set point is reached, it is stable and maintained. Control loop trend data shall be in real-time with the time between data points 30 seconds or less.

3.4.11 Performance Verification Testing Report

Upon successful completion of the PVT, submit a PVT Report to the Government and prior to the Government taking use and possession of the facility. Do not submit the report until all problems are corrected and successfully re-tested. The report shall include the annotated PVT Plan used during the PVT. Where problems were identified, explain each problem and the corrective action taken. Include a written certification that the installation and testing of the control system is complete and meets all of the contract's requirements.

3.5 TRAINING REQUIREMENTS

Provide a qualified instructor (or instructors) with two years minimum field experience with the installation and programming of similar BACnet DDC systems. Orient training to the specific systems installed. Coordinate training times with the Contracting Officer and BAS Owner after receiving approval of the training course documentation. Training shall take place at the job site and/or a nearby Government-furnished location. A training day shall occur during normal working hours, last no longer than 8 hours and include a one-hour break for lunch and two additional 15-minute breaks. The project's approved Controls System Operators Manual shall be used as the training text. The Contractor shall ensure the manuals are submitted, approved, and available to hand out to the trainees before the start of training.

3.5.1 Training Documentation

Submit training documentation for review 30 days minimum before training. Documentation shall include an agenda for each training day, objectives, a synopses of each lesson, and the instructor's background and qualifications. The training documentation can be submitted at the same time as the project's Controls System Operators Manual.

3.5.2 Phase I Training - Fundamentals

The Phase I training session shall last [one day] [two consecutive days] and be conducted in a classroom environment with complete audio-visual aids provided by the contractor. Provide each trainee a printed 8.5 by 11 inch hard-copy of all visual aids used. Upon completion of the Phase I Training, each trainee should fully understand the project's DDC system fundamentals. The training session shall include the following:

a. BACnet fundamentals (objects, services, addressing) and how/where they are used on this project

b. This project's list of control system components

c. This project's list of points and objects

d. This project's device and network communication architecture

e. This project's sequences of control, and:

f. Alarm capabilities

g. Trending capabilities

h. Troubleshooting communication errors

i. Troubleshooting hardware errors

3.5.3 Phase II Training - Operation

Provide Phase II Training shortly after completing Phase I Training. The Phase II training session shall last [one day] [two consecutive days] and be conducted at the DDC system workstation, at a notebook computer connected to the DDC system in the field, and at other site locations as necessary. Upon completion of the Phase II Training, each trainee should fully understand the project's DDC system operation. The training session shall include the following:

a. A walk-through tour of the mechanical system and the installed DDC components (controllers, valves, dampers, surge protection, switches, thermostats, sensors, etc.)

b. A discussion of the components and functions at each DDC panel

c. Logging-in and navigating at each operator interface type

d. Using each operator interface to find, read, and write to specific controllers and objects

e. Modifying and downloading control program changes

f. Modifying setpoints

g. Creating, editing, and viewing trends

h. Creating, editing, and viewing alarms

i. Creating, editing, and viewing operating schedules and schedule objects

j. Backing-up and restoring programming and data bases

k. Modifying graphic text, backgrounds, dynamic data displays, and links to other graphics

l. Creating new graphics and adding new dynamic data displays and links

m. Alarm and Event management

n. Adding and removing network devices

-- End of Section --

****
This specification section contains proprietary products.
****

TELECOMMUNICATIONS INFRASTRUCTURE STANDARDS
MARINE CORPS BASE, CAMP LEJEUNE

SECTION 27 10 00

BUILDING TELECOMMUNICATIONS CABLING SYSTEM
03/09

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D 709	(2001; R 2007) Laminated Thermosetting Materials
ASTM E 814	(2008b) Standard Test Method for Fire Tests of Through-Penetration Fire Stops

CONSUMER ELECTRONICS ASSOCIATION (CEA)

CEA-310-E	(2005) Racks, Panels, and Associated Equipment

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE Std 100	(2000) The Authoritave Dictionary of IEEE Standards Terms

INSULATED CABLE ENGINEERS ASSOCIATION (ICEA)

ICEA S-83-596	(2001) Fiber Optic Premises Distribution Cable
ICEA S-90-661	(2002) Category 3, 5, & 5e Individually Unshielded Twisted Pair Indoor Cable for Use in General Purpose and LAN Communications Wiring Systems

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA WC 63.1	(2005) Twisted Pair Premise Voice and Data Communications Cables
NEMA WC 66	(2001; Errata 2003) Category 6 and Category 7 100 Ohm Shielded and Unshielded Twisted Pairs

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2007; AMD 1 2008) National Electrical Code - 2008 Edition

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA)

TIA J-STD-607-A	(2002) Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications
TIA-455-21-A	(1988) FOTP-21 - Mating Durability of Fiber Optic Interconnecting Devices
TIA-492AAAA-A	(1998; R 2002) 62.5-um Core Diameter/125-um Cladding Diameter Class 1a Graded-Index Multimode Optical Fibers
TIA-492AAAB	(1998; R 2002) 50-Um Core Diameter/125-Um Cladding Diameter Class IA Graded-Index Multimode Optical Fibers
TIA-492CAAA	(1998; R 2002) Class IVA Dispersion-Unshifted Single-Mode Optical Fibers
TIA-526-14-A	(1998) OFSTP-14A Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant
TIA-526-7	(2002) Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant OFSTP-7
TIA-570-B	(2004) Residential Telecommunications Infrastructure Standard
TIA/EIA-568-B.1	(2001 Addendums 2001, 2003, 2003, 2003, 2004, 2007) Commercial Building Telecommunications Cabling Standard - Part 1: General Requirements
TIA/EIA-568-B.2	(2001) Commercial Building Telecommunications Cabling Standard - Part 2: Balanced Twisted Pair Cabling Components
TIA/EIA-568-B.3	(2000; Addendum 2002) Optical Fiber Cabling Components Standard
TIA/EIA-569-A	(1998; Addenda 2000, 2001) Commercial Building Standards for Telecommunications Pathways and Spaces
TIA/EIA-598-B	(2001) Optical Fiber Calbe Color Coding
TIA/EIA-604-12	(2000) FOCIS 12 Fiber Optic Connector Intermateability Standard Type MT-RJ
TIA/EIA-604-2	(2004) FOCIS 2 Fiber Optic Connector

	Intermateability Standard, Type ST
TIA/EIA-604-3A	(2000) FOCUS 3 Fiber Optic Connector Intermateability Standard
TIA/EIA-606-A	(2002) Administration Standard for the Telecommunications Infrastructure

U.S. DEPARTMENT OF AGRICULTURE (USDA)

RUS Bull 345-83	(1979; Rev Oct 1982) Gas Tube Surge Arrestors (PE-80)

U.S. FEDERAL COMMUNICATIONS COMMISSION (FCC)

FCC Part 68	Connection of Terminal Equipment to the Telephone Network (47 CFR 68)

UNDERWRITERS LABORATORIES (UL)

UL 1286	(2008) Office Furnishings
UL 1666	(2007) Test for Flame Propagation Height of Electrical and Optical-Fiber Cables Installed Vertically in Shafts
UL 1863	(2004; Rev thru Aug 2008) Communication Circuit Accessories
UL 444	(2008; Rev thru Jul 2008) Communications Cables
UL 467	(2007) Standard for Grounding and Bonding Equipment
UL 497	(2001; Rev thru Jun 2004) Protectors for Paired Conductor Communication Circuits
UL 50	(2007) Standard for Enclosures for Electrical Equipment
UL 514C	(1996; Rev thru Jul 2008) Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers
UL 910	(1998) Test for Flame-Propagation and Smoke-Density Values for Electrical and Optical-Fiber Cables Used in Spaces Transporting Environmental Air
UL 969	(1995; Rev thru Dec 2006) Marking and Labeling Systems

1.2 DEFINITIONS

Unless otherwise specified or indicated, electrical and electronics terms used in this specification shall be as defined in TIA/EIA-568-B.1, TIA/EIA-568-B.2, TIA/EIA-568-B.3, TIA/EIA-569-A, TIA/EIA-606-A and IEEE Std 100 and herein.

1.2.1 Main Distribution Frame (MDF)

A physical structure at a central location for terminating permanent backbone cables to interconnect with service provider (SP) equipment at the activity minimum point of presence. The MDF generally includes vendor specific components to support voice and data circuits, building surge protector assemblies, main cross connect blocks, equipment support frames, and wood backboard (if MDF is wall mounted). Depending upon local site conditions, the MDF and BDF may be identical.

1.2.2 Building Distribution Frame (BDF)

A structure with terminations for connecting backbone, campus, and horizontal cabling. The BDF generally includes a cross connect, equipment support frame, and wooden backboard or terminal cabinet. The BDF shall include building protector assemblies when used for campus backbone or SP cabling.

1.2.3 Intermediate Distribution Frame (IDF)

An intermediate termination point for horizontal wiring and cross-connections within telecommunications rooms or wiring closets.

1.2.4 Telecommunications Room (TR)

An enclosed space for telecommunications equipment, terminations, and cross-connect wiring for horizontal cabling, **minimum** size shall be 8' x 10' but could be much larger. Telecommunications rooms should be centrally located unless multiple rooms are used. Access to Telecommunications Rooms normally is from a common area such as a hallway and the door should swing out. Multiple Telecommunications Rooms are required if the usable floor space to be served exceeds 10,000 square feet, or the cable length between the horizontal cross-connect and the telecommunications outlet, including slack, exceeds 295 feet. Multiple telecommunications rooms will be connected by a minimum of two 75 mm (3 inch) conduits. The minimum ceiling height will be eight and one half feet. The flooring shall be sealed concrete to reduce dust and static electricity; no carpet or tile. A separate dedicated 20 amp electrical outlet will be installed for each communications equipment rack needed. Outlets should be installed on the same wall as the conduits or communications backboard if in a lockable communications room. If floor mount cabinets are used, outlets must be in the cabinet to prevent use by others. There should not be an electrical panel within the telecommunications room. The lock on the door shall be keyed to a P4 key. At least one wall, where the point of presence is, should be covered with plywood backboard for mounting equipment, additional boards may be needed for mounting equipment (see BACKBOARDS below).

1.3 ENVIRONMENTAL REQUIREMENTS

Connecting hardware shall be rated for operation under ambient conditions of 0 to 60 degrees C (32 to 140 degrees F) and in the range of 0 to 95 percent relative humidity, non-condensing. Provide HVAC tied into building system that will maintain continuous cooling environmental control (24 hours per day, 365 days per year). If emergency power is available, consider connecting it to the HVAC system.

1.4 SYSTEM DESCRIPTION

The structured telecommunications pathway system shall include permanently installed horizontal and backbone pathways, service entrance facilities, work area pathways, telecommunications outlet assemblies, conduit, and raceway, and hardware for splicing, terminating, and interconnecting. The horizontal system includes the pathway between the telecommunications room and the work area telecommunications outlet. The horizontal system shall be suitable for star topology with the IDF at the center or hub of the star. The backbone pathway system includes intrabuilding and interbuilding inter-connecting pathway to provide connectivity between the MDF's, BDF's, and IDF's. The backbone system shall be suitable for star topology with the MDF at the center or hub of the star.

1.5 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. The following shall be submitted in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and Section 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Telecommunications drawings; G

Distribution frames; G

In addition to Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and Section 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES, provide shop drawings in accordance with paragraph SHOP DRAWINGS.

SD-03 Product Data

Telecommunications cabling (backbone and horizontal); G

Patch panels; G

Telecommunications outlet/connector assemblies; G

Equipment support frame; G

Connector blocks; G

Protector modules; G

Submittals shall include the manufacturer's name, trade name, place of manufacture, and catalog model or number. Include performance and characteristic curves. Submittals shall also include applicable federal, military, industry, and technical society publication references. Should manufacturer's data require supplemental information for clarification, the supplemental information shall be submitted as specified in paragraph REGULATORY REQUIREMENTS and as required in Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and Section 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES.

SD-06 Test Reports

Telecommunications cabling testing; G

Factory reel tests; G

Furnish factory reel tests for optical fiber cables.

SD-07 Certificates

Telecommunications Contractor Qualifications; G

Manufacturer Qualifications; G

Test plan; G

SD-10 Operation and Maintenance Data

Telecommunications cabling and pathway system Data Package 5; G

Submit operations and maintenance data in accordance with Section 01 78 24.05 20 FACILITY OPERATION AND MAINTENANCE SUPPORT INFORMATION and as specified herein.

1.6 ADDITIONAL SUBMITTAL REQUIREMENTS

All submittals of material, equipment and design must be approved by the Base Telephone Office.

1.6.1 Telecommunications Drawings

Provide registered communications distribution designer (RCDD) approved drawings complete with wiring diagrams and details required to prove that the distribution system shall properly support connectivity from the telecommunications equipment room to telecommunications work area outlets. Show the entrance facility and layout of cabling and pathway runs, cross connect points, MDF, BDF, IDF, grounding system, terminating block arrangements and type. Drawings shall depict final telecommunications cabling configuration, including location, color coding, gage, pair assignment, polarization, and terminating blocks layout at cross connect points and patch panels after telecommunications cable installation. Provide a plastic laminated schematic of the as-installed telecommuni-cations cable system showing cabling, MDF's, BDF's, IDF's, and equipment rooms keyed to floor plans by room number. Mount the laminated schematic near the MDF as directed by the Contracting Officer. The Telecommunications Contractor shall receive design approval from the Base Telephone Officer prior to installation.

1.6.2 Distribution Frames

Provide shop drawing showing layout of applicable equipment including incoming cable stub or connector blocks, building protector assembly, outgoing cable connector blocks and equipment spaces and racks.

1.6.3 Qualifications

1.6.3.1 Minimum Contractor Qualifications

Prior to installation, submit data of provider's experience and qualifications. All work under this section shall be performed by and all equipment shall be provided by a certified Telecommunications Contractor,

hereinafter referred to as the Contractor. The Contractor shall have the following qualifications in Telecommunications Systems installation:

a. Contractor shall have a minimum of 3 years experience in the application, installation and testing of the specified systems and equipment to be installed.

b. All supervisors and installers assigned to the installation of this system or any of its components shall be Building Industry Consulting Services International (BICSI) Certified Cabling Installation Technicians, Installer Level 2, or have a minimum of 3 current consecutive years experience in the installation of the specified copper and fiber optic cable and components.

c. Contractor shall include names and locations of two projects successfully completed using optical fiber and copper communications cabling systems. Include specific experience in installing and testing structured telecommunications distribution systems using optical fiber and Category 5E/6 cabling systems. Include written correspondence from users that systems have performed satisfactorily for not less than 18 months.

1.6.3.2 Minimum Manufacturer Qualifications

The equipment and hardware provided under this contract will be from manufacturers that have a minimum of 3 years experience in producing the types of systems and equipment specified.

1.6.4 Test Plan

Provide a complete and detailed test plan for the telecommunications cabling system including a complete list of test equipment for the UTP and optical fiber components and accessories 60 days prior to the proposed test date. Include procedures for certification, validation, and testing.

1.6.5 Additions to Operation and Maintenance Manuals

In addition to requirements of Data package 5 for the telecommunications cabling and pathway system, include the requirements of paragraph entitled "Telecommunications Drawings."

1.7 DELIVERY AND STORAGE

Provide protection from weather, moisture, extreme heat and cold, dirt, dust, and other contaminants for telecommunications cabling and equipment placed in storage.

PART 2 PRODUCTS

2.1 PATHWAYS (BACKBONE AND HORIZONTAL)

TIA/EIA-569-A. Pathway shall be conduit, cable tray, under floor duct, access floor, and wireway, installations. Provide grounding and bonding as required by TIA J-STD-607-A. Cable tray wiring shall comply with NFPA 70. All conduits entering the Telecommunications Room, should be grouped and consolidated, will be home run conduits with a grounding bushing with plastic insert, and shall either extend up from the floor 3 to 4 inches onto the backboard or down from the ceiling 3 to 4 inches onto the backboard, and will be bonded to the TMGB or TGB by a minimum number 6

green sheathed conductor. All penetrations will be sealed with firestopping material. A minimum of two 3 inch conduits will be installed between the Main Telecommunications Room and any sub closets.

2.1.1 Work Area Pathways

Comply with TIA/EIA-569-A, except 1-inch diameter conduit shall not be permitted. Minimum conduit size shall be 1-1/4 inches. System furniture pathways shall comply with UL 1286. All interior furniture systems and panels shall make provisions to maintain the separation for classified and unclassified systems in the systems furniture in accordance with NSTISSAM TEMPEST 2/95. Horizontal cabling for open offices shall comply with TIA/EIA-568-B.1.

2.1.2 Pull Boxes

Construct of galvanized sheet steel with screw-fastened covers. Minimum size of boxes shall be not less than 4 inches wide by 4 inches in length by 3 inches deep for individual 1 inch diameter conduit; minimum size of boxes shall be not less than 12 inches wide by 60 inches long by 12 inches deep for 4 inch conduit. Provide pull boxes where length of conduit exceeds 100 feet or where there are more than two 90 degree bends, or equivalent. Align conduit ends on opposite side of pull boxes. Provide pull boxes in straight lengths of conduit; neither pull boxes nor conduit bodies shall be permitted in lieu of bends.

2.2 BENDS

Inside radius of conduit bend shall be at least 6 times the internal diameter of conduit.

2.3 TELECOMMUNICATIONS OUTLET BOXES

Telecommunications outlet boxes should be placed 6" to the left or right of every electrical outlet box in workable office areas or any area that could be converted into workable office area such as a storage closet; also any conference room should have one floor and one ceiling box. Boxes shall be standard type 4 inches square by 2 1/8 inches deep with 1-inch diameter side knock-outs, with a single gang plaster ring. Mount flush in finished walls at height indicated. Outlet boxes for wall-mounted telephones shall be 2 by 4 by 2 1/8 inches deep with 1 Category 5E/6 cable terminated in a standard wall phone plate; mounted at 54 inches above finished floor. Outlet boxes for handicapped telephone station shall be mounted at a height 48 inches above finished floor. Outlet boxes installed in floor for classrooms or open spaces shall be telecommunications floor boxes large enough to support a surge of users with proper cable management. Floor boxes should not be used in wet areas. Tele electric poles or furniture managed pathways fed from above the wet area should be used. Multi-user Telecommunications Outlet Assembly (MUTOA), i.e. Multimedia Outlet Assemblies, should be placed where best suited for the furniture used in the room.

2.3.1 Telecommunications Cabling

Cabling shall be UL listed for the application and shall comply with TIA/EIA-568-B.1, TIA/EIA-568-B.2, TIA/EIA-568-B.3 and NFPA 70. Provide a labeling system for cabling as required by TIA/EIA-606-A and UL 969. Cable specifications must be provided in submittal and approved by base telephone before installation. Cabling manufactured more than 12 months prior to

date of installation shall not be used.

2.3.1.1 Backbone Copper

ICEA S-90-661, TIA/EIA-568-B.1, TIA/EIA-568-B.2 and UL 444, copper backbone cable shall be solid conductor, 24 AWG, 100 ohm, 100-pair UTP (Unshielded twisted pair), NFPA 70 CMR rated formed into 25 pair binder groups covered with a thermoplastic jacket. NFPA 70 type CMP may be substituted for type CMR. Pair twist-lengths and frequency per unit length shall be determined by the manufacturer. A minimum of two conductor twists per foot is required. Color coding shall comply with industry standards for 25 pair cables. Cable shall be third party verified to comply with EIA/TIA Category 5E/6 requirements. Two 4 pair 24 AWG Category 5E/6 riser (CMR) rated cable rated cable will be installed between the MDF and each of the IDF's and terminated in the patch panel in the last position.

2.3.1.2 Backbone Optical Fiber Between Closets

TIA-492AAAA-A, TIA/EIA-568-B.3, UL 1666, NFPA 70. Optical fiber cable shall be 62.5/125-um, 12-fiber multimode 62.5/125-um and 12-fiber single mode 8/125-um, terminated on ST type connectors, with a non-conductive optical fiber riser cable (OFNR) rating. Nonconductive optical fiber Plenum (OFNP) cable may be substituted for type nonconductive optical fiber riser cable (OFNR). The cable jacket shall be orange and yellow.

2.3.2 Horizontal Cabling

Comply with NFPA 70, NEMA WC 63.1, ICEA S-90-661 and performance characteristics in TIA/EIA-568-B.1.

2.3.2.1 Horizontal Copper

TIA/EIA-568-B.2, NFPA 70, UTP (unshielded twisted pair), 100 ohm. Provide four each individually twisted pair, 24 AWG conductors, Category 5E/6 general purpose cable (USA Manufactured), with a white or gray PVC jacket for odd numbered jacks, and a blue PVC jacket for even numbered jacks (unclassified service). Plenum (CMP) or riser (CMR) cable may be substituted for general purpose cable. If the cabling passes thru a plenum air space then plenum (CMP) rated cable is required.

2.3.2.2 Horizontal Optical Fiber

TIA-492AAAA-A, TIA/EIA-568-B.3, NFPA 70. Optical fiber cable shall be 62.5/125-um, 2-fiber multimode, rated nonconductive optical fiber cable (OFN). Plenum (OFNP) or riser (OFNR) cable may be substituted for general purpose cable. The cable jacket shall be orange and be of single jacket construction. If the cabling passes thru a plenum air space then plenum (CMP) rated cable is required.

2.4 DISTRIBUTION FRAMES

Provide building distribution frames (BDF's), intermediate distribution frames (IDF's), and main distribution frames (MDF's) as shown on design drawings for terminating and cross connecting permanent cabling.

2.4.1 Equipment Support Frame

CEA-310-E.

a. Bracket, wall mounted (for buildings with very low jack count), 8 gauge aluminum. Provide hinged bracket compatible with 482.6 mm panel mounting. Must be in secured telephone room.

b. Rack, wall mounted (for buildings with low jack count), 16 gauge steel construction treated to resist corrosion. Shall be CPI 15320-724 or equivalent. Must be in secured Telephone room or a lockable cabinet CPI 11996-748.

c. Racks, floor mounted modular type, 16 gauge steel construction treated to resist corrosion. **Notwithstanding any other provision of this contract, racks shall be Siemon's RS3-07-S or equivalent approved by base telephone; no other product will be acceptable.** Provide rack with vertical and horizontal cable management channels, top cable troughs and grounding lug. Rack shall be compatible with 482.6 mm panel mounting.

d. Cabinets should be used in areas that are not secured with a P4 key. Cabinets shall be no smaller than 24"W X 48"H X 30"D but can be as large as 7'H X 19"W X 30"D. All cabinets should be lockable and large enough to support all telephone / data equipment required in the building. Dedicated electrical outlets should be installed within the cabinet. A backboard for mounting equipment is still needed when a cabinet is installed (see paragraph "BACKBOARDS" below).

2.4.2 Building Protector Assemblies

Building protector assembly shall have connector blocks for connection to the exterior cable at full capacity.

2.4.2.1 Protector Modules

UL 497, RUS Bull 345-83, three-electrode gas tube or solid state type rated for the application. Provide the number of surge protection modules equal to the number of pairs of exterior cable of the building protector assembly.

2.4.3 Connector Blocks

Notwithstanding any other provision of this contract, provide insulation displacement type, Krone No. 6652-1-880-10, for Category 5E/6 and higher systems; no other product will be acceptable. Provide blocks for the number of backbone cables terminated on the block plus 25 percent spare.

2.4.4 Patch Panels

Provide ports for the number of horizontal cables terminated on the panel plus 25 percent spare. Provide pre-connectorized ST type Optical fiber and copper patch cords for patch panels. Provide patch cords with connectors specified. Patch cords shall meet minimum performance requirements specified in TIA/EIA-568-B.1, TIA/EIA-568-B.2, TIA/EIA-568-B.3 for cables and hardware specified.

2.4.4.1 Modular to Patch Panel

TIA/EIA-568-B.1, TIA/EIA-568-B.2, TIA/EIA-568-B.3. **Notwithstanding any other provision of this contract, CT patch panels shall be Siemon's type CT patch panels, CT-PNL-XX; no other product will be acceptable.** Panels shall be third party verified and shall comply with EIA/TIA Category 5E/6 requirements. Panel shall be constructed of 2.2 mm minimum aluminum and

shall be compatible with an EIA 482.6 mm equipment rack. Panel shall provide ## non-keyed, RJ-45 ports. Patch panels shall terminate the building cabling on 110-style insulation displacement connectors and shall utilize a printed circuit board interface, **notwithstanding any other provision of this contract, Siemon's CT Couplers, No. CT-F-CX-CX-XX.; no other product will be acceptable.** The rear of each panel shall have incoming cable strain-relief routing guides, or rear cable management. Panels shall have each port factory numbered and be equipped with laminated plastic nameplates above each port.

2.4.4.2 Fiber Optic Patch Panel

Provide panel for maintenance and cross-connecting of optical fiber cables. Panel shall be constructed of 2.2 mm minimum aluminum and shall be compatible with EIA 482.6 mm equipment racks. Each panel terminating backbone fiber optic cable shall provide either 6 or 12 ST multimode adapters. Each panel terminating horizontal multi-mode fiber optic cable shall provide 6 multi-mode ST type adapters. Adapters shall utilize metallic alignment sleeves. Provide dust cover for all unused adapters. The rear of each panel shall have a cable management tray a minimum of 203 mm (8 inches) deep with removable cover, incoming cable strain-relief and routing guides. Panels shall have each adapter factory numbered and be equipped with laminated plastic nameplates above each adapter.

2.5 TELECOMMUNICATIONS OUTLET BOXES

Standard type 100 mm square by 54 mm deep with a single gang plaster ring. Mount flush in finished walls at height indicated. Depth of boxes shall be large enough to allow manufacturer's recommended conductor bend radii for fiber.

2.6 TELECOMMUNICATIONS OUTLET/CONNECTOR ASSEMBLIES

2.6.1 Outlet/Connector Copper

Outlet/connectors shall comply with FCC Part 68.5, TIA/EIA-568-B.1, and TIA/EIA-568-B.2. UTP Outlet/connectors shall be UL 1863 listed, non-keyed, 4-pair, constructed of high impact rated thermoplastic housing and shall be third party verified and shall comply with EIA/TIA Category 5E/6 requirements, **notwithstanding any other provision of this contract, Siemon's CT couplers, CT-F-Cx-Cx-xx, of indicated color; no other product will be acceptable.** Outlet/connectors provided for Category 5E/6 UTP cabling shall meet or exceed the requirements for the cable provided. Outlet/connectors shall be terminated using a 110-style PC board connector, color-coded for both T568A and T568B wiring. Each jack shall be wired T568A as indicated. UTP outlet/connectors shall comply with TIA-455-21-A for 500 mating cycles.

2.6.2 Cover Plates

Telecommunications cover plates shall comply with UL 514C, and TIA/EIA-568-B.1, TIA/EIA-568-B.2, TIA/EIA-568-B.3; flush or oversized design constructed of high impact thermoplastic, **notwithstanding any other provision of this contract, Siemon's CT4-FP-xx, of indicated color, factory numbered and be equipped with laminated plastic nameplates; no other product will be acceptable.**

2.6.3 Optical Fiber Distribution Panel

Wall or rack mounted optical fiber distribution panel (OFDP) shall be constructed of 2.2 mm minimum anodized aluminum. Panel shall be divided into two sections, distribution and user. Distribution section shall have strain relief, routing guides and shall be lockable, user section shall have a cover for patch cord protection. Each distribution panel shall provide 6 or 12 ST adapters. Adapters shall utilize metallic alignment sleeves. Provide dust covers for all adapters.

2.7 BACKBOARDS

Provide void-free, interior grade plywood 19 mm (3/4 inch) thick as indicated. Backboards shall be fire rated, with the fire stamp visible, or covered with two coats of gray or a lighter color, nonconductive, fire-retardant paint, on all sides. Boards should be installed 4'Width x 8'Height and cover at least one wall in the telecomm room. Additional boards may be needed anywhere equipment is to be mounted.

2.8 GROUNDING AND BONDING PRODUCTS

Comply with UL 467, TIA J-STD-607-A, and NFPA 70. Components shall be identified as required by TIA/EIA-606-A. The preferred ground for the Telephone Main Grounding Bus (TMGB) bar will be to the Main electrical Distribution Panel (MDP)bus bar, building steel, or the grounding electrode conductor. In most cases; a #6 AWG bonding conductor is recommended for telecommunications. All grounding and bonding conductors within the Telecommunications room will be green sheathed copper conductor, stranded, and labeled as suitable for use as such and tagged "DO NOT REMOVE". The minimum size of the TMGB shall be no smaller than 4" by 10" by 1/4 inch thick; bus bar should be factory made - not contractor fabricated.

2.9 FIRESTOPPING MATERIAL

Provide asbestos-free fire stopping system capable of maintaining an effective barrier against flame and gases. System shall be UL listed and comply with ASTM E 814. Include UL system number UL listed print from manufacturer for each type of floor, wall, and ceiling penetration.

2.10 MANUFACTURER'S NAMEPLATE

Each item of equipment shall 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.

2.11 FIELD FABRICATED NAMEPLATES

ASTM D 709. Provide nameplates for equipment rooms and telecommunications rooms doors in accordance with schedule provided on drawings; Telephone rooms should not be labeled NMCI. Provide laminated plastic nameplates for each equipment enclosure, relay, switch, and device; as specified or as indicated on the drawings. Each nameplate inscription shall identify the function and, when applicable, the position. Nameplates shall be melamine plastic, 0.125 inch thick, white with black center core. Surface shall be matte finish. Corners shall be square. Accurately align lettering and engrave into the core. Minimum size of nameplates shall be one by 2.5 inches. Lettering shall be a minimum of 0.25 inch high normal block style.

PART 3 EXECUTION

3.1 INSTALLATION

Telecommunications pathway systems, including the horizontal and backbone pathway systems, telecommunications outlet/connector assemblies, and associated hardware shall be installed in accordance with TIA/EIA-568-B.1, TIA/EIA-568-B.2, TIA/EIA-568-B.3, TIA/EIA-569-A, NFPA 70, and UL standards as applicable. Metal raceway bases, covers, and dividers shall be bonded and grounded in accordance with TIA J-STD-607-A. Pathways shall be installed in accordance with the following minimum clearance distances of 1.2 meters(4 feet) from motors, generators, frequency converters, transformers, x-ray equipment or uninterruptible power system, 300 mm (12 in) from power conduits and cable systems, 125 mm (5 inches) from fluorescent or high frequency lighting system fixtures.

3.1.1 Cabling

Install Category 5E/6 UTP and optical fiber telecommunications cabling and pathway system as detailed in TIA/EIA-568-B.1, TIA/EIA-568-B.2, and TIA/EIA-568-B.3. Screw terminals shall not be used except where specifically indicated on plans. Use an approved insulation displacement connection (IDC) tool kit for copper cable terminations. Do not untwist Category 5E/6 UTP cables more than 12 mm from the point of termination to maintain cable geometry. Provide service loop on each end of the cable, 3 meters in the telecommunications closet, and 150 mm (6 inch) in the work area outlet for UTP. Do not exceed manufacturers' cable pull tensions for copper cables. Provide a device to monitor cable pull tensions. Do not exceed 110 Newton pull tension for four pair copper cables. Do not chafe or damage outer jacket materials. Use only lubricants approved by cable manufacturer. Do not over cinch cables, or crush cables with staples. Only Velcro type cable straps are allowed on Category 5E/6 cable and optical fiber cable. UTP cable bend radii shall not be less than four times the cable diameter.

3.1.1.1 Backbone Cable

a. Copper Backbone Cable. Install backbone copper cable between MDF, BDF, and IDF equipment as indicated in this specification and on drawings.

b. Optical fiber Backbone Cable. Install backbone optical fiber in indicated pathways. Do not exceed manufacturer's recommended bending radii and pull tension. Prepare cable for pulling by cutting outer jacket 250 mm leaving strength members exposed for approximately 250 mm. Twist strength members together and attach to pulling eye. Vertical cable support intervals shall be in accordance with Manufacturer's recommendations.

3.1.1.2 Horizontal Cabling

Install horizontal cabling and pathway as indicated in this specification and on drawings between MDF, BDF, IDF, and telecommunications outlet assemblies at workstations.

3.1.2 Pathway Installations

Comply with TIA/EIA-569-A, except provide 1-1/4 (32 mm) inch diameter minimum diameter conduit to each outlet from telecommunication room

backboard. Conceal conduit under floor slabs and within finished walls, ceilings, and floors. Keep conduit minimum 150 mm (6 inches) away from parallel runs of electrical power equipment, flues, steam, and hot water pipes. Install conduit parallel with or at right angles to ceilings, walls, and structural members where located above accessible ceilings and where conduit is visible after completion of project. Run conduits in crawl spaces and under floor slabs as if exposed. Install no more than two 1.57 radian (90 degree) bends for a single horizontal cable run. All bends/turns in conduits will be in straight runs of conduit; in no case will a turn be made within a pull box. The minimum size for a pull box in a one inch home run conduit will be 4 inches long by 4 inches wide by 3 inches deep, and for a four inch conduit 60 inches long by 12 inches wide by 12 inches deep. All conduits should contain a bushing at the end to protect the cable from damage and a bonding jumper.

3.1.2.1 Under Floor Duct Pathway Systems

Install cabling and under floor duct in accordance with manufacturers' recommendations.

3.1.2.2 Conduit Installed Under Floor Slabs

Conduit shall be located a minimum of 300 mm (12 inches) below the vapor barrier. Seal all conduit connections and at penetrations through vapor barrier.

3.1.3 Service Entrance Conduit, Overhead

Galvanized rigid steel or IMC from service entrance to service entrance fitting or weatherhead outside of building.

3.1.4 Service Entrance Conduit, Underground

PVC Type EPC-40, galvanized rigid steel, or steel IMC. Underground portion shall be encased in minimum of 75 mm (3 inches) of concrete extending from the building entrance to 1500 mm (5 feet) out from the building and shall be a minimum of 450 mm (18 inches) below slab or grade.

3.1.5 Cable Tray Installation

Install cable tray components in accordance with TIA/EIA-569-A. Only CMP and OFNP type cable shall be installed in a plenum.

3.1.6 Work Area Outlets

All work areas will contain at least two faceplates. Any work area larger than 80 sq feet will require additional faceplates to service any work location in the room within 6 feet of a faceplate. This also applies to any area that could be converted to work space in the future. Recommend a Telecommunications outlet box be placed 6" to the left or right of every electrical outlet box in workable office areas or any area that could be converted into workable office area such as a storage closet. All work area faceplates will contain four Category 5E/6 jacks, **notwithstanding any other provision of this contract, Siemon's CT-F-Cx-Cx-xx or equivalent approved by base telephone; no other product will be acceptable.**

3.1.6.1 Terminations

Terminate UTP cable in accordance with TIA/EIA-568-B.1, TIA/EIA-568-B.2,

TIA/EIA-568-B.3 and wiring configuration as specified, T568A.

3.1.6.2 Faceplates

As a minimum, each jack shall be factory numbered and be equipped with laminated plastic cover over label. Also it shall be labeled as to its function with an icon.

3.1.6.3 Cables

Unshielded twisted pair shall have a minimum of 152 mm (6 inch) slack cable loosely coiled into the telecommunications outlet boxes. Minimum manufacturer's bend radius for each type of cable shall not be exceeded.

3.1.6.4 Pull Cords

Pull cords shall be installed in all conduit serving telecommunications outlets which do not initially have cable installed.

3.1.7 Telecommunications Room Termination

Install termination hardware required for Category 5E/6 and optical fiber system. An insulation displacement tool shall be used for terminating copper cable to insulation displacement connectors (no multi punch tools).

3.1.7.1 Equipment Support Frames

Install in accordance with TIA/EIA-569-A:

a. Bracket / lockable cabinet, wall mounted, approved by base telephone. Mount to plywood backboard per manufacturer's recommendations. Mount so height of highest panel does not exceed 1980 mm (76 inches) above floor. Mount so there is sufficient space remaining on backboard to mount lightning protection, bonding, and cable managers, or install additional backboard.

b. Racks / lockable cabinet, floor mounted modular type, **notwithstanding any other provision of this contract, Siemon's RS3-07-S / CPI T1030-712 or equivalent approved by base telephone; no other product will be acceptable.** Permanently anchor rack to the floor per manufacturer's recommendations. Mount so there is sufficient space remaining on back board to mount lightning protection, bonding, and cable managers, or install additional backboard.

3.1.8 Electrical Penetrations

Seal openings around electrical penetrations through fire resistance-rated wall, partitions, floors, or ceilings using FIRESTOP materials specified and approved for use in this project.

3.1.9 Grounding and Bonding

Will be conducted in accordance with TIA J-STD-607-A, and NFPA 70.

3.1.10 Firestopping

Seal openings around raceway penetrations through fire resistance rated walls, partitions, floors and ceiling utilizing proper firestopping

materials to maintain fire resistive integrity.

3.2 LABELING

3.2.1 Labels

All labels shall be in accordance with TIA/EIA-606-A. The jacks will be numbered in a logical, sequential, clockwise numbering system from 1 to X with a closet designator. Example would be 145C, which is the 145th jack in the C closet. All labels should be factory numbered and be equipped with laminated plastic cover.

3.2.2 Cable

All cables shall be labeled using color labels on both ends with encoded identifiers per TIA/EIA-606-A.

3.2.3 Termination Hardware

All workstation outlets and patch panel connections shall be labeled using color coded labels with encoded identifiers as per TIA/EIA-606-A.

3.3 TESTING

3.3.1 Telecommunications Cabling Testing

Perform telecommunications cabling inspection, verification, and performance tests in accordance with TIA/EIA-568-B.1, TIA/EIA-568-B.2, and TIA/EIA-568-B.3.

3.3.1.1 Inspection

Visually inspect UTP, copper and optical fiber jacket materials for UL or third party certification markings. Inspect cabling terminations in telecommunications rooms and at workstations to confirm color code for tip and ring pin assignments, and inspect cabling connections to confirm compliance with TIA/EIA-568-B.1, TIA/EIA-568-B.2, and TIA/EIA-568-B.3. Visually confirm Category 5E/6 marking of outlets, wallplates, outlet/connectors, and patch panels.

3.3.1.2 Verification Tests

UTP backbone copper cabling shall be tested for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors, and between conductors and shield, if cable has overall shield. Test operation of shorting bars in connection blocks. Test cables after termination but not cross connected. Perform 100 MHz near-end-cross-talk (NEXT) and attenuation tests for Category 5E/6 systems installations.

Perform optical fiber end to end attenuation tests using an optical time domain reflectometer (OTDR) and manufacturer's recommended test procedures. Perform tests in accordance with TIA-526-14-A, Method B for horizontal, multimode optical fiber and TIA-526-7, Method B for backbone, single mode optical fiber. Perform verification acceptance tests and factory reel tests.

3.3.1.3 Performance Tests

a. Category 5E/6 Links. Perform UTP link tests in accordance with TIA/EIA-568-B.1, TIA/EIA-568-B.2, TIA/EIA-568-B.3. Tests shall

include wire map, length, attenuation, NEXT, and propagation delay. Provide results to base telephone office.

b. Optical Fiber Links. Perform optical fiber end-to-end attenuation tests and reel tests at jobsite.

c. As built drawings showing all telecommunications outlets and their numbers shall be provided to base telephone.

3.3.1.4 Final Verification Tests

Perform verification tests for UTP and optical fiber systems after the complete telecommunications cabling and workstation outlet/connectors are installed. The final QC and certification of installation will be performed by Base Telephone after the contractor has provided As Built drawings showing all telecommunications outlets and their numbers; test results with both a hard copy of summary and electronic version of detailed results to the government contract representative.

3.3.1.5 Records

a. Records to be provided for copper shall include the cable specification sheets from the manufacturer, the cable routing and locations, all splice point locations, patch panel and jack locations, cable length, cable reel numbers and installation location, the test results in both hard copy and electronic version.

b. Records to be provided for fiber shall include the cable specification sheets from the manufacturer, the cable routing and locations, all splice point locations, patch panel and jack locations, cable length, cable reel numbers and installation location, the test results in both hard copy and electronic version.

c. As built drawings showing all telecommunications outlets and their numbers.

3.4 SCHEDULE

Some metric measurements in this section are based on mathematical conversion of inch-pound measurements, and not on metric measurement commonly agreed to by the manufacturers or other parties. The inch-pound and metric measurements are as follows:

PRODUCTS	INCH-POUND	METRIC
Outlet Boxes		
1. Standard		
- Length/width	4 inches (square)	100 mm (square)
- Depth	2 1/8 inches	55 mm
2. Telephone Outlet		
- Length	4 inches	100 mm
- Width	2 inches	50 mm
- Depth	2 1/8 inches	55 mm
- Depth	1 1/2 inches	38 mm

-- End of Section --

TELECOMMUNICATIONS INFRASTRUCTURE STANDARDS
MARINE CORPS BASE CAMP LEJEUNE

SECTION 33 82 00

TELECOMMUNICATIONS OUTSIDE PLANT (OSP)
07/10

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM B 1	(2001; R 2007) Standard Specification for Hard-Drawn Copper Wire
ASTM B 8	(2004) Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
ASTM D 1557	(2009) Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3) (2700 kN-m/m3)
ASTM D 709	(2001; R 2007) Laminated Thermosetting Materials

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE C2	(2007; TIA 2007-1; TIA 2007-2; TIA 2007-3; TIA 2007-4; TIA 2007-5) National Electrical Safety Code
IEEE 100	(2000) The Authoritave Dictionary of IEEE Standards Terms

INSULATED CABLE ENGINEERS ASSOCIATION (ICEA)

ICEA S-87-640	(2006) Optical Fiber Outside Plant Communications Cable
ICEA S-98-688	(2006) Broadband Twisted Pair, Aircore, Polyolefin Insulated, Copper Conductors Technical Requirements
ICEA S-99-689	(2006) Broadband Twisted Pair Cable Filled, Polyolefin Insulated, Copper Conductors Technical Requirements

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

ANSI C62.61	(1993) American National Standard for Gas

	Tube Surge Arresters on Wire Line Telephone Circuits

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2008; AMD 1 2008) National Electrical Code

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA)

TIA J-STD-607-A	(2002) Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications
TIA-455-107A	(1999) Component Reflectance or Link/System Return Loss using a Loss Test Set
TIA TIA/EIA-455-204	(2000) FOTP-204 Measurement of Bandwidth on Multimode Fiber
TIA-455-46A	(1990) FOTP-46 Spectral Attenuation Measurement for Long-Length, Graded-Index Optical Fibers
TIA-455-78	(2002B) FOTP-78 Optical Fibres - Part 1-40: Measurement Methods and Test Procedures - Attenuation
TIA-472D000-A	(1993) Fiber Optic Communications Cable for Outside Plant Use
TIA-492CAAA	(1998; R 2002) Class IVA Dispersion-Unshifted Single-Mode Optical Fibers
TIA-492E000	(1996; R 2002) Class IVd Nonzero-Dispersion Single-Mode Optical Fibers for the 1550 nm Window (ANSI/TIA/EIA-492E000)
TIA-526-14-A	(1998) OFSTP-14A Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant
TIA-526-7	(2002; R 2008) Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant OFSTP-7
TIA-568-C.1	(2009) Commercial Building Telecommunications Cabling Standard
TIA-568-C.3	(2008e1) Optical Fiber Cabling Components Standard
TIA-590-A	(1997) Standard for Physical Location and Protection of Below Ground Fiber Optic Cable Plant
TIA-758-A	(2004) Customer-Owned Outside Plant

	Telecommunications Cabling Standard
TIA/EIA-455-B	(1998) Standard Test Procedure for Fiber Optic Fibers, Cables, Transducers, Sensors, Connecting and Terminating Devices, and other Fiber Optic Components
TIA/EIA-568-B.2	(2001) Commercial Building Telecommunications Cabling Standard - Part 2: Balanced Twisted Pair Cabling Components
TIA/EIA-569-B	(2004; Supercedes TIA/EIA-569-A and its Addenda) Commercial Building Standards for Telecommunications Pathways and Spaces (ANSI/TIA/EIA-569-B)
TIA/EIA-598-B	(2001) Optical Fiber Cable Color Coding
TIA/EIA-606-A	(2002) Administration Standard for the Telecommunications Infrastructure

THE SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC SP 6/NACE No.3	(2007) Commercial Blast Cleaning

U.S. DEPARTMENT OF AGRICULTURE (USDA)

RUS 1755	Telecommunications Standards and Specifications for Materials, Equipment and Construction
RUS Bull 1751F-630	(1996) Design of Aerial Plant
RUS Bull 1751F-640	(1995) Design of Buried Plant, Physical Considerations
RUS Bull 1751F-643	(2002) Underground Plant Design
RUS Bull 1751F-815	(1979) Electrical Protection of Outside Plant
RUS Bull 1753F-201	(1997) Acceptance Tests of Telecommunications Plant (PC-4)
RUS Bull 1753F-401	(1995) Splicing Copper and Fiber Optic Cables (PC-2)
RUS Bull 345-50	(1979) Trunk Carrier Systems (PE-60)
RUS Bull 345-65	(1985) Shield Bonding Connectors (PE-65)
RUS Bull 345-72	(1985) Filled Splice Closures (PE-74)
RUS Bull 345-83	(1979; Rev Oct 1982) Gas Tube Surge Arrestors (PE-80)

UNDERWRITERS LABORATORIES (UL)

UL 497	(2001; R 2001 thru 2009) Standard for

	Protectors for Paired Conductor Communication Circuits
UL 510	(2005; R 2008) Standard for Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape
UL 83	(2008) Thermoplastic-Insulated Wires and Cables

1.2 RELATED REQUIREMENTS

Section 27 10 00 BUILDING TELECOMMUNICATIONS CABLING SYSTEM, and D-B Contractor prepared Section 33 71 01 OVERHEAD TRANSMISSION AND DISTRIBUTION, and D-B Contractor prepared Section 33 71 02.00 20 UNDERGROUND ELECTRICAL DISTRIBUTION apply to this section with additions and modifications specified herein.

1.3 DEFINITIONS

Unless otherwise specified or indicated, electrical and electronics terms used in this specification shall be as defined in TIA-568-C.1, TIA/EIA-568-B.2, TIA-568-C.3, TIA/EIA-569-B, TIA/EIA-606-A, and IEEE 100 and herein.

1.3.1 Campus Distributor (CD)

A distributor from which the campus backbone cabling emanates. (International expression for main cross-connect - (MC).)

1.3.2 Entrance Facility (EF) (Telecommunications)

An entrance to the building for both private and public network service cables (including antennae) including the entrance point at the building wall and continuing to the entrance room or space.

1.3.3 Entrance Room (ER)

A centralized space for telecommunications equipment that serves the occupants of a building. Equipment housed therein is considered distinct from a telecommunications room because of the nature of its complexity.

1.3.4 Building Distributor (BD)

A distributor in which the building backbone cables terminate and at which connections to the campus backbone cables may be made. (International expression for intermediate cross-connect - (IC).)

1.3.5 Pathway

A physical infrastructure utilized for the placement and routing of telecommunications cable.

1.4 SYSTEM DESCRIPTION

The telecommunications outside plant consists of cable, conduit, manholes, poles, etc. required to provide signal paths from the closest point of presence to the new facility, including free standing frames or backboards, interconnecting hardware, terminating cables, lightning and surge

protection modules at the entrance facility. The work consists of providing, testing and making operational cabling, interconnecting hardware and lightning and surge protection necessary to form a complete outside plant telecommunications system for continuous use. The telecommunications contractor must coordinate with Base Telephone concerning layout and configuration of the EF telecommunications and OSP. The telecommunications contractor may be required to coordinate work effort for access to the EF telecommunications and OSP with Base Telephone.

1.5 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and Section 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES:

a. Submittals shall include the manufacturer's name, trade name, place of manufacture, and catalog model or number. Submittals shall also include applicable federal, military, industry, and technical society publication references. Should manufacturer's data require supplemental information for clarification, the supplemental information shall be submitted as specified in paragraph "Regulatory Requirements" and as required for certificates in Section 01 33 00 SUBMITTAL PROCEDURES Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and Section 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES.

b. Commercial off-the-shelf manuals shall be provided for operation, installation, configuration, and maintenance of products provided as a part of the telecommunications outside plant (OSP). Submit operations and maintenance data in accordance with Section 01 78 23 OPERATION AND MAINTENANCE DATA Section 01 78 24.05 20 FACILITY OPERATION AND MAINTENANCE SUPPORT INFORMATION, and as specified herein not later than 2 months prior to the date of beneficial occupancy. In addition to requirements of Section 01 78 23 OPERATION AND MAINTENANCE DATA Section 01 78 24.05 20 FACILITY OPERATION AND MAINTENANCE SUPPORT INFORMATION, include the requirements of paragraphs "Telecommunications Outside Plant Shop Drawings" and "Telecommunications Entrance Facility Drawings."

SD-02 Shop Drawings

Telecommunications Outside Plant; G

Telecommunications Entrance Facility Drawings; G

SD-03 Product Data

Wire and cable; G

Cable splices, and connectors; G

Closures; G

Building protector assemblies; G

Protector modules; G

Cross-connect terminal cabinets; G

Spare Parts; G

SD-06 Test Reports

Pre-installation tests; G

Acceptance tests; G

Outside Plant Test Plan; G

SD-07 Certificates

Telecommunications Contractor Qualifications; G

Key Personnel Qualifications; G

Minimum Manufacturer's Qualifications; G

SD-08 Manufacturer's Instructions

Building protector assembly installation; G

Cable tensions; G

Fiber Optic Splices; G

Submit instructions prior to installation.

SD-09 Manufacturer's Field Reports

Factory Reel Test Data; G

SD-10 Operation and Maintenance Data

Telecommunications outside plant (OSP), Data Package 5; G

SD-11 Closeout Submittals

Record Documentation; G

In addition to other requirements, provide in accordance with paragraph "Record Documentation".

1.6 QUALITY ASSURANCE

1.6.1 Shop Drawings

Include wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure a coordinated installation. Wiring diagrams shall identify circuit terminals and indicate the internal wiring for each item of equipment and the interconnection between each item of equipment. Drawings shall indicate adequate clearance for operation, maintenance, and replacement of operating equipment devices. Submittals shall include the nameplate data, size, and capacity. Submittals shall also include applicable federal, military, industry, and technical society publication references.

1.6.1.1 Telecommunications Outside Plant Shop Drawings

Provide Outside Plant Design in accordance with TIA-758-A, RUS Bull 1751F-630 for aerial system design, RUS Bull 1751F-643 for underground duct system design and for direct buried system design. Provide T0 shop drawings that show the physical and logical connections from the perspective of an entire campus, such as actual building locations, exterior pathways and campus backbone cabling on plan view drawings, major system nodes, and related connections on the logical system drawings in accordance with TIA/EIA-606-A. Drawings shall include wiring and schematic diagrams for fiber optic and copper cabling and splices, copper conductor gauge and pair count, fiber pair count and type, pathway duct and innerduct arrangement, associated construction materials, and any details required to demonstrate that cable system has been coordinated and will properly support the switching and transmission system identified in specification and drawings. Provide Registered Communications Distribution Designer (RCDD) approved drawings of the telecommunications outside plant. Update existing telecommunication Outside Plant T0 drawings to include information modified, deleted or added as a result of this installation in accordance with TIA/EIA-606-A. The telecommunications outside plant (OSP) shop drawings shall be included in the operation and maintenance manuals.

1.6.1.2 Telecommunications Entrance Facility Drawings

Provide T3 drawings for EF Telecommunications in accordance with TIA/EIA-606-A that include telecommunications entrance facility plan views, pathway layout (cable tray, racks, ladder-racks, etc.), mechanical/electrical layout, and cabinet, rack, backboard, and wall elevations. Drawings shall show layout of applicable equipment including building protector assembly, incoming cable connector blocks, patch panels and equipment spaces, and cabinet/racks. Drawings shall include a complete list of equipment and material, equipment rack details, proposed layout and anchorage of equipment and appurtenances, and equipment relationship to other parts of the work including clearance for maintenance and operation. Drawings may also be an enlargement of a congested area of T1 or T2 drawings. Provide T3 drawings for EF Telecommunications as specified in the paragraph "Telecommunication Space Drawings" of Section 27 10 00 BUILDING TELECOMMUNICATIONS CABLING SYSTEM. The telecommunications entrance facility shop drawings shall be included in the operation and maintenance manuals.

1.6.2 Telecommunications Qualifications

Work under this section shall be performed by and the equipment shall be provided by the approved telecommunications contractor and key personnel. Qualifications shall be provided for: the telecommunications system contractor, the telecommunications system installer, the supervisor (if different from the installer), and the cable splicing and terminating personnel. A minimum of 30 days prior to installation, submit documentation of the experience of the telecommunications contractor and of the key personnel.

1.6.2.1 Telecommunications Contractor Qualifications

The telecommunications contractor shall be a firm which is regularly and professionally engaged in the business of the applications, installation, and testing of the specified telecommunications systems and equipment. The telecommunications contractor shall demonstrate experience in providing successful telecommunications systems that include outside plant and

broadband cabling within the past 3 years. Submit documentation for a minimum of three and a maximum of five successful telecommunication system installations for the telecommunications contractor. Each of the key personnel shall demonstrate experience in providing successful telecommunications systems in accordance with TIA-758-A within the past 3 years.

1.6.2.2 Key Personnel Qualifications

Provide key personnel who are regularly and professionally engaged in the business of the application, installation and testing of the specified telecommunications systems and equipment. There may be one key person or more key persons proposed for this solicitation depending upon how many of the key roles each has successfully provided. Each of the key personnel shall demonstrate experience in providing successful telecommunications systems within the past 3 years.

Cable splicing and terminating personnel assigned to the installation of this system or any of its components shall have training in the proper techniques and have a minimum of 3 years experience in splicing and terminating the specified cables. Modular splices shall be performed by factory certified personnel or under direct supervision of factory trained personnel for products used.

Supervisors and installers assigned to the installation of this system or any of its components shall have factory or factory approved certification from each equipment manufacturer indicating that they are qualified to install and test the provided products.

Submit documentation for a minimum of three and a maximum of five successful telecommunication system installations for each of the key personnel. Documentation for each key person shall include at least two successful system installations provided that are equivalent in system size and in construction complexity to the telecommunications system proposed for this solicitation. Include specific experience in installing and testing telecommunications outside plant systems, including broadband cabling, and provide the names and locations of at least two project installations successfully completed using optical fiber and copper telecommunications cabling systems. All of the existing telecommunications system installations offered by the key persons as successful experience shall have been in successful full-time service for at least 18 months prior to the issuance date for this solicitation. Provide the name and role of the key person, the title, location, and completed installation date of the referenced project, the referenced project owner point of contact information including name, organization, title, and telephone number, and generally, the referenced project description including system size and construction complexity.

Indicate that all key persons are currently employed by the telecommunications contractor, or have a commitment to the telecommunications contractor to work on this project. All key persons shall be employed by the telecommunications contractor at the date of issuance of this solicitation, or if not, have a commitment to the telecommunications contractor to work on this project by the date that the bid was due to the Contracting Officer.

Note that only the key personnel approved by the Contracting Officer in the successful proposal shall do work on this solicitation's telecommunications system. Key personnel shall function in the same roles in this contract,

as they functioned in the offered successful experience. Any substitutions for the telecommunications contractor's key personnel requires approval from the Contracting Officer.

1.6.2.3 Minimum Manufacturer's Qualifications

Cabling, equipment and hardware manufacturers shall have a minimum of 3 years experience in the manufacturing, assembly, and factory testing of components which comply with, TIA-568-C.1, TIA/EIA-568-B.2 and TIA-568-C.3. In addition, cabling manufacturers shall have a minimum of 3 years experience in the manufacturing and factory testing of cabling which comply with ICEA S-87-640, ICEA S-98-688, and ICEA S-99-689.

1.6.3 Outside Plant Test Plan

Prepare and provide a complete and detailed test plan for field tests of the outside plant including a complete list of test equipment for the copper conductor and optical fiber cables, components, and accessories for approval by the Contracting Officer. Include a cut-over plan with procedures and schedules for relocation of facility station numbers without interrupting service to any active location. Submit the plan at least 30 days prior to tests for Contracting Officer approval. Provide outside plant testing and performance measurement criteria in accordance with TIA-568-C.1 and RUS Bull 1753F-201. Include procedures for certification, validation, and testing that includes fiber optic link performance criteria.

1.6.4 Standard Products

Provide materials and equipment that are standard products of manufacturers regularly engaged in the production of such products which are of equal material, design and workmanship and shall be the manufacturer's latest standard design that has been in satisfactory commercial or industrial use for at least two years prior to bid opening. The two year period shall include applications of equipment and materials under similar circumstances and of similar size. The product shall have been on sale on the commercial market through advertisements, manufacturer's catalogs, or brochures during the two year period. Products supplied shall be specifically designed and manufactured for use with outside plant telecommunications systems. Where two or more items of the same class of equipment are required, these items shall be products of a single manufacturer; however, the component parts of the item need not be the products of the same manufacturer unless stated in this section.

1.6.4.1 Alternative Qualifications

Products having less than a two-year field service record will be acceptable if a certified record of satisfactory field operation for not less than 6000 hours, exclusive of the manufacturer's factory or laboratory tests, is provided.

1.6.4.2 Material and Equipment Manufacturing Date

Products manufactured more than 3 years prior to date of delivery to site shall not be used, unless specified otherwise.

1.6.5 Regulatory Requirements

In each of the publications referred to herein, consider the advisory provisions to be mandatory, as though the word, "shall" had been

substituted for "should" wherever it appears. Interpret references in these publications to the "authority having jurisdiction," or words of similar meaning, to mean the Contracting Officer. Equipment, materials, installation, and workmanship shall be in accordance with the mandatory and advisory provisions of NFPA 70 unless more stringent requirements are specified or indicated.

1.6.5.1 Independent Testing Organization Certificate

In lieu of the label or listing, submit a certificate from an independent testing organization, competent to perform testing, and approved by the Contracting Officer. The certificate shall state that the item has been tested in accordance with the specified organization's test methods and that the item complies with the specified organization's reference standard.

1.7 DELIVERY, STORAGE, AND HANDLING

Ship cable on reels in 5000 foot lengths for 25, 50 or 100 pair configuration and 1250 feet length for larger cables. Radius of the reel drum shall not be smaller than the minimum bend radius of the cable. Wind cable on the reel so that unwinding can be done without kinking the cable. Two meters of cable at both ends of the cable shall be accessible for testing. Attach permanent label on each reel showing length, cable identification number, cable size, cable type, and date of manufacture. Provide water resistant label and the indelible writing on the labels. Apply end seals to each end of the cables to prevent moisture from entering the cable. Reels with cable shall be suitable for outside storage conditions when temperature ranges from minus 40 degrees C to plus 65 degrees C, with relative humidity from 0 to 100 percent. Equipment, other than cable, delivered and placed in storage shall be stored with protection from weather, humidity and temperature variation, dirt and dust, or other contaminants in accordance with manufacturer's requirements.

1.8 MAINTENANCE

1.8.1 Record Documentation

Provide the activity responsible for telecommunications system maintenance and administration a single complete and accurate set of record documentation for the entire telecommunications system with respect to this project.

Provide record documentation as specified in Section 27 10 00 BUILDING TELECOMMUNICATIONS CABLING SYSTEM.

Provide T5 drawings including documentation on cables and termination hardware in accordance with TIA/EIA-606-A. T5 drawings shall include schedules to show information for cut-over and cable plant management, patch panel layouts, cross-connect information and connecting terminal layout as a minimum. T5 drawings shall be provided in both hard copy format and on electronic media using Windows based computer cable management software. A licensed copy of the cable management software including documentation shall be provided. Update existing record documentation to reflect campus distribution T0 drawings and T3 drawing schedule information modified, deleted or added as a result of this installation. Provide the following T5 drawing documentation as a minimum:

a. Cables - A record of installed cable shall be provided in accordance with TIA/EIA-606-A. The cable records shall include

only the required data fields on the hard copy and the required data fields for each cable and complete end-to-end circuit report for each complete circuit from the assigned outlet to the entry facility for the soft copy in accordance with TIA/EIA-606-A. Include manufacture date of cable with submittal.

b. Termination Hardware - Provide a record of installed patch panels, cross-connect points, campus distributor and terminating block arrangements and type in accordance with TIA/EIA-606-A. Documentation shall include the required data fields in accordance with TIA/EIA-606-A.

1.8.2 Spare Parts

In addition to the requirements of Section 01 78 23 OPERATION AND MAINTENANCE DATA Section 01 78 24.05 20 FACILITY OPERATION AND MAINTENANCE SUPPORT INFORMATION, provide a complete list of parts and supplies, with current unit prices and source of supply, and a list of spare parts recommended for stocking. Spare parts shall be provided no later than the start of field testing.

1.9 WARRANTY

The equipment items shall be supported by service organizations which are reasonably 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.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

Products supplied shall be specifically designed and manufactured for use with outside plant telecommunications systems.

2.2 TELECOMMUNICATIONS ENTRANCE FACILITY

2.2.1 Building Protector Assemblies

Building protector assembly shall be self-contained and have interconnecting hardware for connection to exterior cabling at full capacity. Provide manufacturers instructions for building protector assembly installation. Provide copper cable interconnecting hardware as specified in Section 27 10 00 BUILDING TELECOMMUNICATIONS CABLING SYSTEM.

2.2.2 Protector Modules

Provide in accordance with UL 497 three-electrode gas tube or solid state type, 5 pin rated for the application. Provide gas tube protection modules in accordance with RUS Bull 345-83 and shall be heavy duty, A>10kA, B>400, C>65A, where A is the maximum single impulse discharge current, B is the impulse life and C is the AC discharge current in accordance with ANSI C62.61. The gas modules shall shunt high voltage to ground, fail short, and be equipped with an external spark gap and heat coils in accordance with UL 497. Provide the number of surge protection modules equal to the number of pairs of exterior cable of the building protector assembly.

2.2.3 Fiber Optic Terminations

Provide fiber optic cable terminations as specified in Section 27 10 00 BUILDING TELECOMMUNICATIONS CABLING SYSTEM.

2.2.4 Pathways

For underground applications, provide a minimum of two (2) four inch ducts, one of which contains four (4) one (1) inch innerducts, 3 inch concrete encased, 24 inches below grade minimum, from the Telecommunications Entrance Facility to the maintenance hole that will be providing service to the building. The ducts will be plugged at both ends.

For direct buried applications, provide a minimum of two (2) four inch ducts from the Telecommunications Entrance Facility to five feet outside the building, 24 inches below grade. The ducts will be plugged at both ends and clearly marked on outside end.

Handholes and maintenance holes shall be traffic rated (MIN tier 15). Handhole size min 4'x4'x4'. Maintenance hole size min 6'x7'x8'.

2.3 CLOSURES

2.3.1 Copper Conductor Closures

2.3.1.1 Aerial Cable Closures (Off-Base)

Provide cable closure assembly consisting of a frame with clamps, a lift-off polyethylene cover, cable nozzles, and drop wire rings. Closure shall be suitable for use on Figure 8 cables. Closures shall be free breathing and suitable for housing either straight-through type or the branch type splices of non-pressurized communications cables and shall be sized as indicated. The closure shall be constructed with ultraviolet resistant PVC.

NOTE: The installation of aerial telecommunications cabling aboard Marine Corps Base, Camp Lejeune and Marine Corps Air Station, New River is not authorized.

2.3.1.2 Underground Cable Closures

a. Aboveground. Provide aboveground closures constructed of not less than 14 gauge steel and acceptable pole or stake mounting in accordance with RUS 1755.910. Closures shall be sized and contain a marker as indicated. Covers shall be secured to prevent unauthorized entry. PVC type closures are to be used in beach areas. All pedestals shall contain a minimum 4 foot x 3/8 inch pigtailed ground rod.

b. Direct burial. Provide buried closure suitable for enclosing a straight, butt, and branch splice in a container into which can be poured an encapsulating compound. Closure shall have adequate strength to protect the splice and maintain cable shield electrical continuity in the buried environment. Encapsulating compound shall be re-enterable and shall not alter the chemical stability of the closure. Provide filled splice cases in accordance with RUS Bull 345-72.

c. In vault or manhole. Provide underground closure suitable to

house a straight, butt, and branch splice in a protective housing into which can be poured an encapsulating compound. Closure shall be of suitable thermoplastic, thermoset, or stainless steel material supplying structural strength necessary to pass the mechanical and electrical requirements in a vault or manhole environment. Encapsulating compound shall be re-enterable and shall not alter the chemical stability of the closure. Provide filled splice cases in accordance with RUS Bull 345-72.

2.3.2 Fiber Optic Closures

2.3.2.1 Aerial (Off-Base)

Provide aerial closure that is free breathing and suitable for housing splice organizer of non-pressurized cables. Closure shall be constructed from heavy PVC with ultraviolet resistance.

NOTE: The installation of aerial telecommunications cabling aboard Marine Corps Base, Camp Lejeune and Marine Corps Air Station, New River is not authorized.

2.3.2.2 Direct Burial

Provide buried closure suitable to house splice organizer in protective housing into which can be poured an encapsulating compound. Closure shall have adequate strength to protect the splice and maintain cable shield electrical continuity, when metallic, in buried environment. Encapsulating compound shall be reenterable and shall not alter chemical stability of the closure.

2.3.2.3 Vaults or Manholes

Provide underground closure suitable to house splice organizer in a protective housing into which can be poured an encapsulating compound. Closure shall be of thermoplastic, thermoset, or stainless steel material supplying structural strength necessary to pass the mechanical and electrical requirements in a vault or manhole environment. Encapsulating compound shall be reenterable and shall not alter the chemical stability of the closure.

2.4 PAD MOUNTED CROSS-CONNECT TERMINAL CABINETS

Provide in accordance with RUS 1755.910 and the following:

a. Constructed of 14 gauge steel.

b. Equipped with a double set of hinged doors with closed-cell foam weatherstripping. Doors shall be locked and contain a marker as indicated.

c. Equipped with spool spindle bracket, mounting frames, binding post log, jumpering instruction label, and load coil mounting provisions.

d. Complete with cross connect modules to terminate number of pairs as indicated.

e. Sized as indicated.

2.5 CABLE SPLICES, AND CONNECTORS

2.5.1 Copper Cable Splices

Provide multi-pair, in-line fold back or single pair, in-line splices of a moisture resistant, three-wire insulation displacement connector held rigidly in place to assure maximum continuity in accordance with RUS Bull 1753F-401. Cables greater than 25 pairs shall be spliced using multi-pair splicing connectors, which accommodate 25 pairs of conductors at a time. Provide correct connector size to accommodate the cable gauge of the supplied cable. Provide enough cable slack suitable for splicing operations, but in no case less than 10 feet.

2.5.2 Copper Cable Splice Connector

Provide splice connectors with a polycarbonate body and cap and a tin-plated brass contact element. Connector shall accommodate 19 to 26 AWG solid wire with a maximum insulation diameter of 0.065 inch. Fill connector with sealant grease to make a moisture resistant connection, in accordance with RUS Bull 1753F-401.

2.5.3 Fiber Optic Cable Splices

Provide fiber optic cable splices and splicing materials for fusion methods at locations shown on the construction drawings. The splice insertion loss shall be 0.3 dB maximum when measured in accordance with TIA-455-78 using an Optical Time Domain Reflectometer (OTDR). Splices shall be designed for a return loss of 40.0 db max for single mode fiber when tested in accordance with TIA-455-107A. Physically protect each fiber optic splice by a splice kit specially designed for the splice. Provide enough cable slack suitable for splicing operations, but in no case less than 30 feet.

2.5.4 Fiber Optic Splice Organizer

Provide splice organizer suitable for housing fiber optic splices in a neat and orderly fashion. Splice organizer shall allow for a minimum of 1 m (3 feet) of fiber for each fiber within the cable to be neatly stored without kinks or twists. Splice organizer shall accommodate individual strain relief for each splice and allow for future maintenance or modification, without damage to the cable or splices. Provide splice organizer hardware, such as splice trays, protective glass shelves, and shield bond connectors in a splice organizer kit. All fiber optic cable shall be installed according to Manufacturer's product Standard Recommended Procedure (SRP).

2.5.5 Shield Connectors

Provide connectors with a stable, low-impedance electrical connection between the cable shield and the bonding conductor in accordance with RUS Bull 345-65.

2.6 CONDUIT

Provide conduit as specified in D-B Contractor prepared Section 33 71 02.00 20 UNDERGROUND ELECTRICAL DISTRIBUTION.

2.7 PLASTIC INSULATING TAPE

UL 510.

2.8 WIRE AND CABLE

2.8.1 Copper Conductor Cable

Solid copper conductors, covered with an extruded solid insulating compound. Insulated conductors shall be twisted into pairs which are then stranded or oscillated to form a cylindrical core. For special high frequency applications, the cable core shall be separated into compartments. Cable shall be completed by the application of a suitable core wrapping material, a corrugated copper or plastic coated aluminum shield, and an overall extruded jacket. Telecommunications contractor shall verify distances between splice points prior to ordering cable in specific cut lengths. Gauge of conductor shall determine the range of numbers of pairs specified; 19 gauge (6 to 400 pairs), 22 gauge (6 to 1200 pairs), 24 gauge (6 to 2100 pairs), and 26 gauge (6 to 3000 pairs). Copper conductors shall conform to the following: All copper conductor cable from 6 to 1800 pair shall be PE-39 type.

2.8.1.1 Underground

Provide filled cable (type PE-39) meeting the requirements of ICEA S-99-689 and RUS 1755.390. Provide enough cable slack suitable for splicing operations, but in no case less than 10 feet.

2.8.1.2 Aerial (Off-Base)

Provide filled cable meeting the requirements of ICEA S-99-689, ICEA S-98-688, and RUS 1755.390 except that it shall be suitable for aerial installation and shall be Figure 8 distribution wire with 26,700 N (6,000 pound) Class A galvanized steel or 26,700 N (6,000 pound) aluminum-clad steel strand.

NOTE: The installation of aerial telecommunications cabling aboard Marine Corps Base, Camp Lejeune and Marine Corps Air Station, New River is not authorized.

2.8.1.3 Screen

Provide screen-compartmental core cable filled cable meeting the requirements of ICEA S-99-689 and RUS 1755.390.

2.8.2 Fiber Optic Cable

Provide single-mode, 8/125-um, 0.10 aperture 1310 & 1550 nm fiber optic cable in accordance with TIA-492CAAA, TIA-492E000, TIA-472D000-A, and ICEA S-87-640 including any special requirements made necessary by a specialized design. Provide a minimum of 24 optical fibers. Fiber optic cable shall be specifically designed for outside use with loose tubed buffer construction and corning glass and must be shielded. Provide fiber optic color code in accordance with TIA/EIA-598-B.

2.8.2.1 Strength Members

Provide central/non-central, and non-metallic/metallic strength members with sufficient tensile strength for installation and residual rated loads to meet the applicable performance requirements in accordance with ICEA S-87-640. The strength member is included to serve as a cable core foundation to reduce strain on the fibers, and shall not serve as a pulling strength member.

2.8.2.2 Shielding or Other Metallic Covering

Provide bare aluminum or coated aluminum single tape covering or shield in accordance with ICEA S-87-640 on all cables.

2.8.2.3 Performance Requirements

Provide fiber optic cable with optical and mechanical performance requirements in accordance with ICEA S-87-640.

2.8.3 Grounding and Bonding Conductors

Provide grounding and bonding conductors in accordance with RUS 1755.200, TIA J-STD-607-A, IEEE C2, and NFPA 70. Solid bare copper wire meeting the requirements of ASTM B 1 for sizes No. 8 AWG and smaller and stranded bare copper wire meeting the requirements of ASTM B 8, for sizes No. 6 AWG and larger. Insulated conductors shall have 600-volt, Type TW insulation meeting the requirements of UL 83.

2.9 T-SPAN LINE TREATMENT REPEATERS

Provide as indicated. Repeaters shall be pedestal mounted with pressurized housings, sized as indicated and shall meet the requirements of RUS Bull 345-50.

2.10 POLES AND HARDWARE (OFF-BASE)

Provide poles and hardware as specified in D-B Contractor prepared Section 33 71 01 OVERHEAD TRANSMISSION AND DISTRIBUTION.

NOTE: The installation of aerial telecommunications cabling aboard Marine Corps Base, Camp Lejeune and Marine Corps Air Station, New River is not authorized.

2.11 CABLE TAGS IN MANHOLES, HANDHOLES, AND VAULTS

Provide tags for each telecommunications cable or wire located in manholes, handholes, and vaults. Cable tags shall be stainless steel or polyethylene and labeled in accordance with TIA/EIA-606-A. Handwritten labeling is unacceptable.

2.11.1 Stainless Steel

Provide stainless steel, cable tags 41.25 mm (1 5/8 inches) in diameter 1.58 mm (1/16 inch) thick minimum, and circular in shape. Tags shall be die stamped with numbers, letters, and symbols not less than 6.35 mm (0.25 inch) high and approximately 0.38 mm (0.015 inch) deep in normal block style.

2.11.2 Polyethylene Cable Tags

Provide tags of polyethylene that have an average tensile strength of 22.4 MPa (3250 pounds per square inch); and that are two millimeter (0.08 inch) thick minimum, non-corrosive non-conductive; resistive to acids, alkalis, organic solvents, and salt water; and distortion resistant to 77 degrees C (170 degrees F). Provide 1.3 mm (0.05 inch) minimum thick black polyethylene tag holder. Provide a one-piece nylon, self-locking tie at each end of the cable tag. Ties shall have a minimum loop tensile strength

of 778.75 N (175 pounds). The cable tags shall have black block letters, numbers, and symbols 25 mm (one inch) high on a yellow background. Letters, numbers, and symbols shall not fall off or change positions regardless of cable tag orientation.

2.12 BURIED WARNING AND IDENTIFICATION TAPE

Provide metallic fiber optic media marking and protection in accordance with TIA-590-A. Provide color, type and depth of tape as specified in paragraph "Buried Warning and Identification Tape" in D-B Contractor prepared Section 31 23 00.00 20 EXCAVATION AND FILL.

2.13 GROUNDING BRAID

Provide grounding braid that provides low electrical impedance connections for dependable shield bonding in accordance with RUS 1755.200. Braid shall be made from flat tin-plated copper.

2.14 MANUFACTURER'S NAMEPLATE

Each item of equipment shall 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.

2.15 FIELD FABRICATED NAMEPLATES

Provide laminated plastic nameplates in accordance with ASTM D 709 for each patch panel, protector assembly, rack, cabinet and other equipment or as indicated on the drawings. Each nameplate inscription shall identify the function and, when applicable, the position. Nameplates shall be melamine plastic, 3 mm (0.125 inch) thick, white with black center core. Surface shall be matte finish. Corners shall be square. Accurately align lettering and engrave into the core. Minimum size of nameplates shall be 25 by 65 mm (one by 2.5 inches). Lettering shall be a minimum of 6.35 mm (0.25 inch) high, and of normal block style.

2.16 TESTS, INSPECTIONS, AND VERIFICATIONS

2.16.1 Factory Reel Test Data

Test 100 percent OTDR test of FO media at the factory in accordance with TIA-568-C.1 and TIA-568-C.3. Use TIA-526-7 for single mode fiber and TIA-526-14-A Method B for multi mode fiber measurements. Calibrate OTDR to show anomalies of 0.2 dB minimum. Enhanced performance filled OSP copper cables, referred to as Broadband Outside Plant (BBOSP), shall meet the requirements of ICEA S-99-689. Enhanced performance air core OSP copper cables shall meet the requirements of ICEA S-98-688. Submit test reports, including manufacture date for each cable reel and receive approval before delivery of cable to the project site.

PART 3 EXECUTION

3.1 INSTALLATION

Install all system components and appurtenances in accordance with manufacturer's instructions IEEE C2, NFPA 70, and as indicated. Provide all necessary interconnections, services, and adjustments required for a complete and operable telecommunications system.

3.1.1 Contractor Damage

Promptly repair indicated utility lines or systems damaged during site preparation and construction. Damages to lines or systems not indicated, which are caused by Contractor operations, shall be treated as "Changes" under the terms of the Contract Clauses. When Contractor is advised in writing of the location of a nonindicated line or system, such notice shall provide that portion of the line or system with "indicated" status in determining liability for damages. In every event, immediately notify the Contracting Officer of damage.

3.1.2 Cable Inspection and Repair

Handle cable and wire provided in the construction of this project with care. Inspect cable reels for cuts, nicks or other damage. Damaged cable shall be replaced or repaired to the satisfaction of the Contracting Officer. Reel wraps shall remain intact on the reel until the cable is ready for placement.

3.1.3 Direct Burial System

Installation shall be in accordance with RUS Bull 1751F-640. Under railroad tracks, paved areas, and roadways install cable in conduit encased in concrete. Slope ducts to drain. Excavate trenches by hand or mechanical trenching equipment. Provide a minimum cable cover of 915mm (36 inches) below finished grade for both fiber and copper cable. Trenches shall be not less than 155 mm (6 inches) wide and in straight lines between cable markers. Do not use cable plows. Bends in trenches shall have a radius of not less than 915 mm (36 inches). Where two or more cables are laid parallel in the same trench, space laterally at least 78 mm (3 inches) apart. When rock is encountered, remove it to a depth of at least 78 mm (3 inches) below the cable and fill the space with sand or clean earth, free from particles larger than 6 mm (1/4 inch). Do not unreel and pull cables into the trench from one end. Cable may be unreeled on grade and lifted into position. Provide color, type and depth of metallic warning tape as specified in paragraph "Buried Warning and Identification Tape" in D-B Contractor prepared Section 31 23 00.00 20 EXCAVATION AND FILL.

3.1.3.1 Cable Placement

a. Prior to design and installation of any copper or optical fiber cable systems, cable routes and pathways must be approved by the Base Telephone Officer.

b. Separate cables crossing other cables or metal piping from the other cables or pipe by not less than 78 mm (3 inches) of well tamped earth. Do not install circuits for communications under or above traffic signal loops.

c. Cables shall be in one piece without splices between connections except where the distance exceeds the lengths in which the cable is furnished.

d. Avoid bends in cables of small radii and twists that might cause damage. Do not bend cable and wire in a radius less than 10 times the outside diameter of the cable or wire.

e. Leave a horizontal slack of approximately 3048 mm (10 feet) in the

ground on each end of cable runs, on each side of connection boxes, and at points where connections are brought aboveground. Where cable is brought above ground, leave additional slack to make necessary connections.

3.1.3.2 Identification Markers

Provide a marker at each change of direction of the cable, over the ends of ducts or conduits which are installed under paved areas and roadways and over each splice. Identification markers shall be of concrete, approximately 20 inches square by 6 inches thick.

3.1.3.3 Backfill for Rocky Soil

When placing cable in a trench in rocky soil, the cable shall be cushioned by a fill of sand or selected soil at least 2 inches thick on the floor of the trench before placing the cable or wire. The backfill for at least 4 inches above the wire or cable shall be free from stones, rocks, or other hard or sharp materials which might damage the cable or wire. If the buried cable is placed less than 24 inches in depth, a protective cover of concrete shall be used.

3.1.4 Cable Protection

Provide direct burial cable protection in accordance with NFPA 70 and as specified in D-B Contractor prepared Section 33 71 02.00 20 UNDERGROUND ELECTRICAL DISTRIBUTION. Galvanized conduits which penetrate concrete (slabs, pavement, and walls) shall be PVC coated and shall extend from the first coupling or fitting outside either side of the concrete minimum of 155 mm per 305 mm (6 inches per 12 inches) burial depth beyond the edge of the surface where cable protection is required; all conduits shall be sealed on each end. Where additional protection is required, cable may be placed in galvanized iron pipe (GIP) sized on a maximum fill of 40% of cross-sectional area, or in concrete encased 103 mm (4 inches) PVC pipe. Conduit may be installed by jacking or trenching. Trenches shall be backfilled with earth and mechanically tamped at 155 mm (6 inches) lift so that the earth is restored to the same density, grade and vegetation as adjacent undisturbed material.

3.1.4.1 Cable End Caps

Cable ends shall be sealed at all times with coated heat shrinkable end caps. Cables ends shall be sealed when the cable is delivered to the job site, while the cable is stored and during installation of the cable. The caps shall remain in place until the cable is spliced or terminated. Sealing compounds and tape are not acceptable substitutes for heat shrinkable end caps. Cable which is not sealed in the specified manner at all times will be rejected.

3.1.5 Underground Duct

Provide underground duct and connections to existing manholes, handholes, concrete pads, or existing ducts as specified in D-B Contractor prepared Section 33 71 02.00 20 UNDERGROUND ELECTRICAL DISTRIBUTION with any additional requirements as specified herein. Minimum size of ducts shall be 103mm (4 inch) and minimum number will be two (2).

3.1.6 Reconditioning of Surfaces

Provide reconditioning of surfaces as specified in D-B Contractor prepared Section 33 71 02.00 20 UNDERGROUND ELECTRICAL DISTRIBUTION.

3.1.7 Penetrations

Caulk and seal cable access penetrations in walls, ceilings and other parts of the building. Seal openings around electrical penetrations through fire resistance-rated wall, partitions, floors, or ceilings in accordance with D-B Contractor prepared Section 07 84 00 FIRESTOPPING.

3.1.8 Cable Pulling

Test duct lines with a mandrel and swab out to remove foreign material before the pulling of cables. Avoid damage to cables in setting up pulling apparatus or in placing tools or hardware. Do not step on cables when entering or leaving the manhole. Do not place cables in ducts other than those shown without prior written approval of the Contracting Officer. Roll cable reels in the direction indicated by the arrows painted on the reel flanges. Set up cable reels on the same side of the manhole as the conduit section in which the cable is to be placed. Level the reel and bring into proper alignment with the conduit section so that the cable pays off from the top of the reel in a long smooth bend into the duct without twisting. Under no circumstances shall the cable be paid off from the bottom of a reel. Check the equipment set up prior to beginning the cable pulling to avoid an interruption once pulling has started. Use a cable feeder guide of suitable dimensions between cable reel and face of duct to protect cable and guide cable into the duct as it is paid off the reel. As cable is paid off the reel, lubricate and inspect cable for sheath defects. When defects are noticed, stop pulling operations and notify the Contracting Officer to determine required corrective action. Cable pulling shall also be stopped when reel binds or does not pay off freely. Rectify cause of binding before resuming pulling operations. Provide cable lubricants recommended by the cable manufacturer. Avoid bends in cables of small radii and twists that might cause damage. Do not bend cable and wire in a radius less than 10 times the outside diameter of the cable or wire.

3.1.8.1 Cable Tensions

Obtain from the cable manufacturer and provide to the Contracting Officer, the maximum allowable pulling tension. This tension shall not be exceeded.

3.1.8.2 Pulling Eyes

Equip cables 1.25 inches in diameter and larger with cable manufacturer's factory installed pulling-in eyes. Provide cables with diameter smaller than 1.25 inches with heat shrinkable type end caps or seals on cable ends when using cable pulling grips. Rings to prevent grip from slipping shall not be beaten into the cable sheath. Use a swivel of 3/4 inch links between pulling-in eyes or grips and pulling strand.

3.1.8.3 Installation of Cables in Manholes, Handholes, and Vaults

Do not install cables utilizing the shortest route, but route along those walls providing the longest route and the maximum spare cable lengths. Form cables to closely parallel walls, not to interfere with duct entrances, and support cables on brackets and cable insulators at a maximum of 4 feet. In existing manholes, handholes, and vaults where new ducts are to be

terminated, or where new cables are to be installed, modify the existing installation of cables, cable supports, and grounding as required with cables arranged and supported as specified for new cables. Identify each cable with corrosion-resistant embossed metal tags.

3.1.9 Aerial Cable Installation (Off-Base)

Pole installation shall be as specified in D-B Contractor prepared Section 33 71 01 OVERHEAD TRANSMISSION AND DISTRIBUTION. Where physical obstructions make it necessary to pull distribution wire along the line from a stationary reel, use cable stringing blocks to support wire during placing and tensioning operations. Do not place ladders, cable coils, and other equipment on or against the distribution wire. Wire shall be sagged in accordance with the data shown. Protect cable installed outside of building less than 8 feet above finished grade against physical damage.

NOTE: The installation of aerial telecommunications cabling aboard Marine Corps Base, Camp Lejeune and Marine Corps Air Station, New River is not authorized.

3.1.9.1 Figure 8 Distribution Wire

Perform spiraling of the wire within 24 hours of the tensioning operation. Perform spiraling operations at alternate poles with the approximate length of the spiral being 4575 mm (15 feet). Do not remove insulation from support members except at bonding and grounding points and at points where ends of support members are terminated in splicing and dead-end devices. Ground support wire at poles to the pole ground.

3.1.9.2 Suspension Strand

Place suspension strand as indicated. Tension in accordance with the data indicated. When tensioning strand, loosen cable suspension clamps enough to allow free movement of the strand. Place suspension strand on the road side of the pole line. In tangent construction, point the lip of the suspension strand clamp toward the pole. At angles in the line, point the suspension strand clamp lip away from the load. In level construction place the suspension strand clamp in such a manner that it will hold the strand below the through-bolt. At points where there is an up-pull on the strand, place clamp so that it will support strand above the through-bolt. Make suspension strand electrically continuous throughout its entire length, bond to other bare cables suspension strands and connect to pole ground at each pole.

3.1.9.3 Aerial Cable (Off-Base)

Keep cable ends sealed at all times using cable end caps. Take cable from reel only as it is placed. During placing operations, do not bend cables in a radius less than 10 times the outside diameter of cable. Place temporary supports sufficiently close together and properly tension the cable where necessary to prevent excessive bending. In those instances where spiraling of cabling is involved, accomplish mounting of enclosures for purposes of loading, splicing, and distribution after the spiraling operation has been completed.

NOTE: The installation of aerial telecommunications cabling aboard Marine Corps Base, Camp Lejeune and Marine Corps Air Station, New River is not authorized.

3.1.10 Cable Splicing

3.1.10.1 Copper Conductor Splices

Perform splicing in accordance with requirements of RUS Bull 1753F-401 except that direct buried splices and twisted and soldered splices are not allowed. Exception does not apply for pairs assigned for carrier application.

3.1.10.2 Fiber Optic Splices

Fiber optic splicing shall be in accordance with manufacturer's recommendation and shall exhibit an insertion loss not greater than 0.3 dB for fusion splices.

3.1.11 Surge Protection

All cables and conductors, except fiber optic cable, which serve as communication lines through off-premise lines, shall have surge protection installed at each end which meet the requirements of RUS Bull 1751F-815.

3.1.12 Grounding

Provide grounding and bonding in accordance with RUS 1755.200, TIA J-STD-607-A, IEEE C2, and NFPA 70. Ground exposed noncurrent carrying metallic parts of telephone equipment, cable sheaths, cable splices, and terminals.

3.1.12.1 Telecommunications Master Ground Bar (TMGB)

The TMGB is the hub of the basic telecommunications grounding system providing a common point of connection for ground from outside cable, CD, and equipment. Establish a TMGB for connection point for cable stub shields to connector blocks and CD protector assemblies as specified in D-B Contractor prepared Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM. The TMGB will at a minimum be 4 inches by 10 inches by 1/4 inch.

3.1.12.2 Incoming Cable Shields

Shields shall not be bonded across the splice to the cable stubs at the main distribution frame. Ground shields of incoming cables in the EF Telecommunications to the TMGB.

3.1.12.3 Campus Distributor Grounding

a. Protection assemblies: Mount CD protector assemblies directly on the telecommunications backboard. Connect assemblies mounted on each vertical frame with number 6 AWG copper conductor to provide a low resistance path to TMGB.

b. TMGB connection: Connect TMGB to TGB with copper conductor with a total resistance of less than 0.01 ohms.

3.1.13 Cut-Over

All necessary transfers and cut-overs, shall be accomplished by the telecommunications contractor.

3.2 LABELING

3.2.1 Labels

Provide labeling for new cabling and termination hardware located within the facility in accordance with TIA/EIA-606-A. Handwritten labeling is unacceptable. Stenciled lettering for cable and termination hardware shall be provided using either thermal ink transfer process or laser printer.

3.2.2 Cable Tag Installation

Install cable tags for each telecommunications cable or wire located in manholes, handholes, and vaults including each splice. Tag new wire and cable provided under this contract and existing wire and cable which are indicated to have splices and terminations provided by this contract. The labeling of telecommunications cable tag identifiers shall be in accordance with TIA/EIA-606-A. Tag legend shall be as indicated. Do not provide handwritten letters. Install cable tags so that they are clearly visible without disturbing any cabling or wiring in the manholes, handholes, and vaults.

3.2.3 Termination Hardware

Label patch panels, distribution panels, connector blocks and protection modules using color coded labels with identifiers in accordance with TIA/EIA-606-A.

3.3 FIELD APPLIED PAINTING

Provide ferrous metallic enclosure finishes in accordance with the following procedures. Ensure that surfaces are dry and clean when the coating is applied. Coat joints and crevices. Prior to assembly, paint surfaces which will be concealed or inaccessible after assembly. Apply primer and finish coat in accordance with the manufacturer's recommendations. Provide ferrous metallic enclosure finishes as specified in D-B Contractor prepared Section 09 90 00 PAINTS AND COATINGS.

3.3.1 Cleaning

Clean surfaces in accordance with SSPC SP 6/NACE No.3.

3.3.2 Priming

Prime with a two component polyamide epoxy primer which has a bisphenol-A base, a minimum of 60 percent solids by volume, and an ability to build up a minimum dry film thickness on a vertical surface of 5.0 mils. Apply in two coats to a total dry film thickness of 5 to 8 mils.

3.3.3 Finish Coat

Finish with a two component urethane consisting of saturated polyester polyol resin mixed with aliphatic isocyanate which has a minimum of 50 percent solids by volume. Apply to a minimum dry film thickness of 2 to 3 mils. Color shall be the manufacturer's standard.

3.4 FIELD FABRICATED NAMEPLATE MOUNTING

Provide number, location, and letter designation of nameplates as indicated. Fasten nameplates to the device with a minimum of two

sheet-metal screws or two rivets.

3.5 FIELD QUALITY CONTROL

Provide the Contracting Officer 10 working days notice prior to each test. Provide labor, equipment, and incidentals required for testing. Correct defective material and workmanship disclosed as the results of the tests. Furnish a signed copy of the test results to the Contracting Officer within 3 working days after the tests for each segment of construction are completed. Perform testing as construction progresses and do not wait until all construction is complete before starting field tests.

3.5.1 Pre-Installation Tests

Perform the following tests on cable at the job site before it is removed from the cable reel. For cables with factory installed pulling eyes, these tests shall be performed at the factory and certified test results shall accompany the cable.

3.5.1.1 Cable Capacitance

Perform capacitance tests on all pairs within a cable to determine if cable capacitance is within the limits specified.

3.5.1.2 Loop Resistance

Perform DC-loop resistance on all of the pairs within a cable to determine if DC-loop resistance is within the manufacturer's calculated resistance.

3.5.1.3 Pre-Installation Test Results

Provide results of pre-installation tests to the Contracting Officer at least 5 working days before installation is to start. Results shall indicate reel number of the cable, manufacturer, size of cable, pairs tested, and recorded readings. When pre-installation tests indicate that cable does not meet specifications, remove cable from the job site.

3.5.2 Acceptance Tests

Perform acceptance testing in accordance with RUS Bull 1753F-201 and as further specified in this section. Provide personnel, equipment, instrumentation, and supplies necessary to perform required testing. Notification of any planned testing shall be given to the Contracting Officer at least 14 days prior to any test unless specified otherwise. Testing shall not proceed until after the Contractor has received written Contracting Officer's approval of the test plans as specified. Test plans shall define the tests required to ensure that the system meets technical, operational, and performance specifications. The test plans shall define milestones for the tests, equipment, personnel, facilities, and supplies required. The test plans shall identify the capabilities and functions to be tested. Provide test reports in booklet form showing all field tests performed, upon completion and testing of the installed system. Measurements shall be tabulated on a pair by pair or strand by strand basis.

3.5.2.1 Copper Conductor Cable

Perform the following acceptance tests in accordance with TIA-758-A:

a. Wire map (pin to pin continuity)

b. Continuity to remote end

c. Crossed pairs

d. Reversed pairs

e. Split pairs

f. Shorts between two or more conductors

g. Grounded pairs.

3.5.2.2 Fiber Optic Cable

Test fiber optic cable in accordance with TIA/EIA-455-B and as further specified in this section. Two optical tests shall be performed on all optical fibers: Optical Time Domain Reflectometry (OTDR) Test, and Attenuation Test. In addition, a Bandwidth Test shall be performed on all multimode optical fibers. These tests shall be performed on the completed end-to-end spans which include the near-end pre-connectorized single fiber cable assembly, outside plant as specified, and the far-end pre-connectorized single fiber cable assembly. Field connector terminations should be done to test at demarcation point.

a. OTDR Test: The OTDR test shall be used to determine the adequacy of the cable installations by showing any irregularities, such as discontinuities, micro-bendings or improper splices for the cable span under test. Hard copy fiber signature records shall be obtained from the OTDR for each fiber in each span and shall be included in the test results. The OTDR test shall be measured in both directions. A reference length of fiber, 1000 feet minimum, used as the delay line shall be placed before the new end connector and after the far end patch panel connectors for inspection of connector signature. Conduct OTDR test and provide calculation or interpretation of results in accordance with TIA-526-7 for single-mode fiber and TIA-526-14-A for multimode fiber. Splice losses shall not exceed 0.3 db.

b. Attenuation Test: End-to-end attenuation measurements shall be made on all fibers, in both directions, using a 850 & 1300 nanometer light source for 62.5 multi-mode fiber and 1310 & 1550 nanometer light source for single mode fiber at one end and the optical power meter on the other end to verify that the cable system attenuation requirements are met in accordance with TIA-455-46A for multimode and TIA-526-7 for single-mode fiber optic cables. The measurement method shall be in accordance with TIA-455-78. Attenuation losses shall not exceed 0.5 db/km at 1310 nm and 1550 nm for single-mode fiber. Attenuation losses shall not exceed 5.0 db/km at 850 nm and 1.5 db/km at 1300 nm for multimode fiber.

c. Bandwidth Test: The end-to-end bandwidth of all multimode fiber span links shall be measured by the frequency domain method. The bandwidth shall be measured in both directions on all fibers. The bandwidth measurements shall be in accordance with TIA TIA/EIA-455-204.

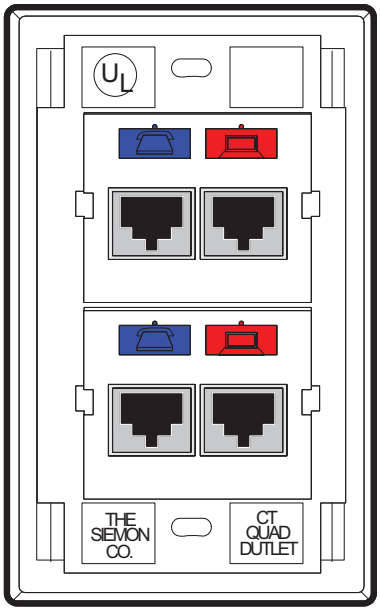
3.5.3 Soil Density Tests

a. Determine soil-density relationships for compaction of backfill material in accordance with ASTM D 1557, Method D.

b. Determine soil-density relationships as specified for soil tests in D-B Contractor prepared Section 31 23 00.00 20 EXCAVATION AND FILL.

-- End of Section --

SIEMON



CT4-FP-20

CT-F-C5-C5-20

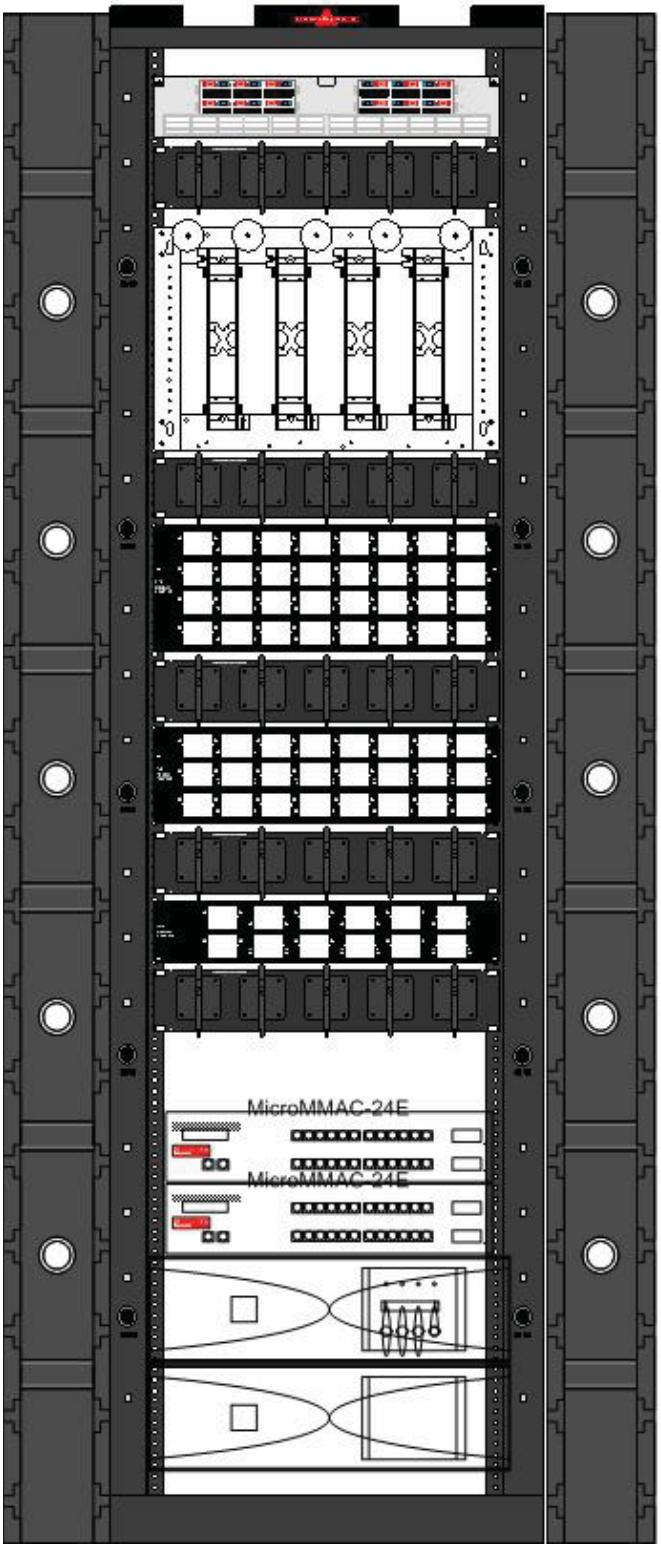
CT-F-C5-C5-20

FOR COPPER ONLY TO THE FACEPLATE

MCB CAMP LEJEUNE SPECS

On Backboard -
PROTECTOR, BUILDING ENTRANCE BEP
TMGB
Proper Bonding & grounding
Cable slack properly managed
Cable management to rack

RS2-07-S or RS3-07-S
in comm room;
or T1030-712 CPI Cabinet
on open office space



OSP termination
PCH-01U
ST connectors

FIBER
Distribution

CABLE MANAGER

CC-2014-TS-DC

KRONE' BLOCKS
6652-1-880-10

COPPER

CABLE MANAGER

CT-PNL-64
CT-F-C5-C5-01
WM-BK

CABLE MANAGER

CT-PNL-48
CT-F-C5-C5-01
WM-BK

CABLE MANAGER

CT-PNL-24
CT-F-C5-C5-01
WM-BK

CABLE MANAGER

Number of telecommunications work outlets determine number and size of patch panel and need for additional racks

If more than 3 racks are used: place the NMCI switch / cable termination rack towards the center

NMCI Switch Space

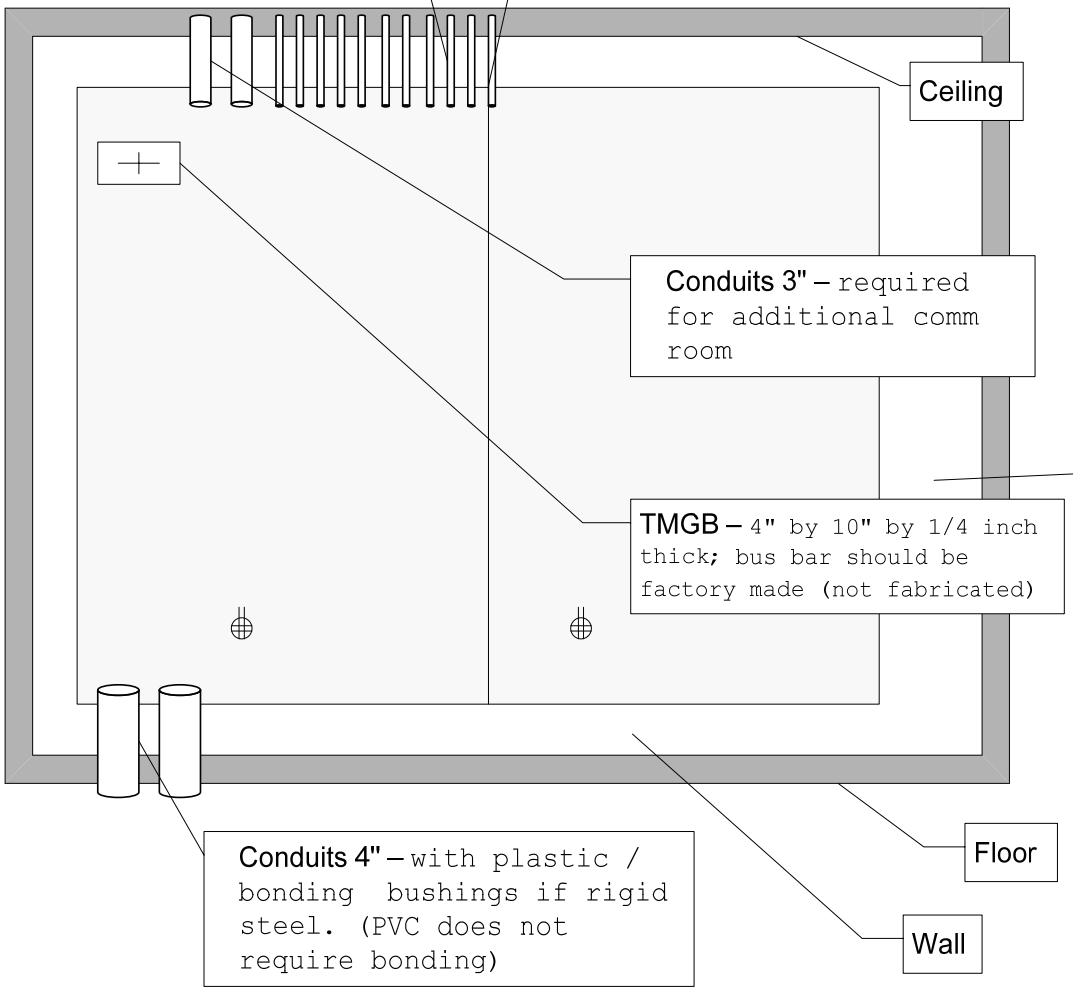
NMCI UPS

MCB
CAMP LEJEUNE
SPECS

Telecommunications Backboard Example

Conduits 1" – with plastic / bonding bushings - home run to work area outlet or cable tray.

Telephone backboard - 4'x8' Provide min 2 void-free, interior grade plywood 19 mm (3/4 inch) thick as indicated. Backboards shall be fire rated, with the fire stamp visible or covered with two coats of gray or a lighter color nonconductive fire-retardant paint on all sides. Boards should be installed 4′ Width x 8′ Height securely fastened to the wall anywhere equipment is to be mounted.



General notes

-all metalic conduit and equipment must be bonded to the TMGB and building ground per TIA J-STD-607-A with min #6AWG stranded green sheath conductor.

-all conduits need to be securely mounted, fire stopped, and over lap the back board by 3-6".

-1 dedicated 20 amp quad power is required per comm. rack/cabinet.

-If wired by base telephone; contractor should install all except the below and add pull strings in conduits.

-if wired by contractor; install 4 CAT5E/6A cables in each 1" conduit to typical work area outlet; also install all ladder racks, patch panels, cabinets, building protectors, OSP cable, riser cable, and equipment IAW Base Tele 27 10 00 .

NOT to Scale for reference only

PART 6

ATTACHMENTS

C-3 MECHANICAL.

C-3.1 **General Requirements.** NMCI equipment must operate continuously (year-round), as must other telecommunications equipment co-located within the NMCI and Telecommunications (NMCI/Telecom) spaces. These equipment installations generate internal sensible heat, with little to no latent heat (moisture) except for that produced by any personnel located within the space. The space cooling equipment must be able to operate year-round, without regard to whether the rest of the facility requires cooling, heating, or only ventilation. Heating and cooling systems on building time clocks or other temperature setback means, are not to be used for NMCI/Telecom spaces

- Provide NMCI/Telecom spaces with independent heating & cooling systems.

The ventilation (outside air) must be provided by the systems serving the remainder of the building, unless the NMCI/Telecom space is regularly staffed. If the NMCI/Telecom space is regularly staffed, the independent heating and cooling systems must condition the outside air for these spaces.

- Provide conditioned outside air ventilation in compliance with ASHRAE Standard 62 *Ventilation for Acceptable Indoor Air Quality*.

Unless personnel are located in the NMCI/Telecom spaces most of the time, size the cooling equipment to be able to provide at least 20% latent heat (moisture removal) capacity, but size to utilize about 90% of the total capacity to meet the sensible loads. For calculated loads less than one ton (12,000 BTU/hr), provide a single air conditioner (A/C) unit, with space and power capacity available to install another identical one for future load growth. For loads greater than one ton, install two identical units sized for 50% to 60% of the load each, and provide space and power capacity for an additional identical size unit for future load growth. For loads greater than about 10 tons, <u>and</u> where redundant UPS have been installed in the NMCI/Telecom equipment, provide more than two A/C units to meet the N + 1 redundancy criteria, where N is the number of A/C units required to meet the load (not less than 2) and 1 is the identical size redundant spare. In addition to the 1 redundant spare A/C unit, provide space and power capacity for one additional identical size A/C unit for future load growth.

Air conditioning equipment should be installed near an exterior wall, if possible, to allow easy use of outdoor condensing units, with indoor evaporators. Since the ventilation load is to be taken by the separate building system, no HVAC ductwork should need to penetrate the exterior wall, unless the space is to be regularly manned and outside air is to be conditioned by the NMCI provided independent system. High wall-mounted ductless split system air

conditioner units are suggested, connecting through the wall via a single conduit penetration that contains the refrigerant supply and suction lines, the power and control cables, and the condensate disposal line directly & immediately outside the NMCI/Telecom space. Avoid running any condensate lines above the NMCI/Telecom equipment and, if possible, keep these lines entirely out of the space. Cassette type ductless split system evaporators, laying in suspended ceiling systems are an acceptable, but less desirable, solution. These rely on a condensate pump and line to convey the condensate out of the space. Where a raised floor is provided sufficiently high enough to act as a plenum, floor-mounted DX computer room air conditioners may be used. Pay particular attention to sealing each penetration of the exterior wall, floor or roof, to preclude penetration of wind-driven rain or snow. Ensure air conditioning systems are able to start and operate at both low and high ambient outside air temperatures to maintain the design indoor conditions.

Utilize single evaporator units with individual condenser units, to maintain the redundancy needed. Split units are available with up to 3 or 4 indoor evaporator coils driven by a single outdoor condenser unit. While this is suitable for homes and offices, it is not appropriate for the redundancy required by the NMCI/Telecom rooms.

Chilled water systems, and evaporative-cooled water-glycol systems, are discouraged in order to reduce the probability of fluid leaks and possible damage to the NMCI/Telecom equipment in the space. If these systems exist, and have extra capacity available, they may be used; but only if the cooling coil units are located outside the NMCI/Telecom spaces, and the supply and return air is ducted into and out of the space. Insulate both supply air and return air ducts within the NMCI/Telecom spaces to prevent condensation from forming on the ducts and dripping onto the electronic equipment.

Avoid running refrigerant lines within the NMCI/Telecom space. If refrigerant suction lines must be run within the NMCI/Telecom space, insulate them and run them inside of a conduit made of pvc or cpvc pipe, with cemented joints made water-tight; also, insulate the outside of the conduit. The insulation must be flexible cellular type. Pitch the conduit to drain outside the NMCI/Telecom space.

Provide corrosion protection for all outdoor equipment located in salt-laden coastal areas. Provide snow protection for all outdoor equipment located in areas subject to heavy snow accumulations.

C-3.2 **Design Conditions.** Temperature is to be maintained at 23.8 ^{o}C +/- 5 ^{o}C (75 ^{o}F +/- 10 ^{o}F.) No humidity control is required. Under emergency conditions, variation of +/- 10 ^{o}C (+/- 20 ^{o}F) is acceptable.

Designer must base the cooling load calculations upon the actual equipment to be installed, if known; see Tables D-1, D-2, and D-3. If actual equipment is unknown, base load calculations on not less than one Type "SIDF1" equipment rack for NMCI (Table D-3 Cabinet SIDF1 = 3728 BTU/HR). If co-located Telecom equipment (such as Telephone racks & switches, Fire alarm panels, and Intrusion Detection Systems) is to be present, consider it equivalent to not less than one Type "SIDF2" equipment rack (Table D-3 Cabinet SIDF2 = 5170 BTU/HR). These loads do not include the infrastructure loads such as lighting and other equipment located within the NMCI/Telecom spaces.

Calculate the cooling load on the design cooling day, and the heating load on the design heating day, without the surrounding rooms being conditioned, as though on an extended weekend shutdown of the remaining building systems, similar to a 3 or 4 day holiday period. Further, size the heating system to maintain the design minimum temperature without the NMCI/Telecom equipment operating.

Cooling capacity must be adequate to cover the completely built-out space with a + 10% margin.

Existing building cooling is acceptable, provided the system is capable of preventing the NMCI/Telecom equipment from overheating in the event of a commercial power interruption. Air systems such as variable air volume units are also acceptable to meet cooling requirements. An EDS-provided independent cooling system for the POP equipment space is an EDS choice of last resort. The power requirements for the air conditioning equipment, when provided by EDS, are included in the electrical loads in Appendix D. Note:

- If cooling shuts off and power stays on, NMCI equipment must be cooled. The redundant A/C units or ambient exhaust ventilation must be sufficient to offer adequate cooling.

- If power shuts off, NMCI equipment will shut off once the UPS is depleted.

The ambient temperature will be measured 1.5 m (5 ft) above the floor level, after the equipment is in operation, at any point along an equipment aisle center line. (ANSI / TIA / EIA 569-A, Section 8, paragraph 8.2.3.6.3).

Rev 1.25.10
Previous 7.2.09

MCB CAMP LEJEUNE, N.C. MECHANICAL POLICIES

HVAC

1. Use the latest revision of ASHRAE 62 for guidance on indoor air quality. For the purposes of outside air ventilation only, typical occupancy is considered that which happens at least once a week for buildings that follow a regular schedule or at least 15 times a year for non-schedule type buildings.

2. Chilled water VAV with zone reheat is the preferred HVAC system **for offices** and should be considered wherever appropriate. VAV zone boxes with out fans are preferable to units with fans. **In non-fan powered zone boxes, when specifying minimum air flow the designer shall consider diffuser dumping. If a zone has a large variance of load profile from neighboring zones a fan powered box should be considered to avoid dumping of diffusers. Chilled water VAV with fan powered terminal units is the preferred HVAC system for BEQ/BOQ's. Zone reheat shall be as specified in the scope (10.14.08). VAV Fan powered terminal units shall have a fan volume of 50 cfm to 50% greater than the maximum primary air flow. (1.8.10)**

3. Particular attention should be given to humidity control by air conditioning equipment. Cooling units 7.5 tons and smaller shall not have modulating water controls unless based on a constant 55 F supply temperature. Larger units may have split face coils to give capacity step control (progressive modulating chilled water valves may be used). Modulating face and bypass dampers are okay on any size equipment

4. Rooftop HVAC equipment should be used with discretion. Maintenance access is more difficult, controls and water piping are exposed to more extreme conditions and roof is exposed to more abuse and wear. Ladders permanent or temporary inhibit personnel, material and equipment access, and therefore stairways shall be provided to roof top equipment**.**

5. Avoid HVAC systems that modulate cooling supply air temperatures unless outside air is separately conditioned.

6. Avoid use of chilled water fan coil (FCU) systems due the high maintenance associated with them. Coil condensate drain pans are especially problematic. If FCU's are used, ensure adequacy of the drain system.

7. Provide aluminum fins on copper tubes with coating that passes the ASTM B117-90 3000 hour salt spray resistance test for all outdoor coils larger than 10 tons. The heat transfer rating of phenolic-coated coils should be as installed (ie after coating).

8. Air cooled chillers are preferred to water cooled equipment for individual equipment smaller than 150 tons. Camp Lejeune weather is mild and humid which only gives slight efficiency advantage to water cooled equipment. Larger plants such as multiple 400 ton chillers should be water cooled. The efficiency advantage overcomes the additional maintenance of cooling towers.

9. Do not use steam absorption chillers. Helical screw compressors are desirable. Reciprocating and scroll compressors are acceptable. Where applicable on large installations centrifugal equipment is acceptable, (greater than 150 tons). **Oiless centrifugal is acceptable for water cooled applications (1.25.10)**

10. Provide adequate thermal mass in chilled water systems to ensure proper control and longevity of chillers. Chiller manufacturers recommend 2 to 7 minute water loop return times; use a minimum of 5 minutes to size inertia tanks and/or increase pipe sizing/length.

11. Provide primary/secondary pumping systems on multiple building chiller systems and on systems larger 150 tons. Ensure primary loop has sufficient thermal inertia. Be aware that the secondary loop has little influence on staging cycling during low load conditions. (6.20.8)

12. HVAC equipment should not be installed in attics or above suspended ceilings, unless absolutely necessary. When placement in an attic is dictated by necessity, provide stairs to access the attic, and maintenance access to and space around equipment; ships ladders are undesirable. **Provide drain pan float switch to shut down condensing unit or close chilled water valve to the coil. (6.26.9)**

13. Air handling unit filter access doors should be specified as hinged with non-tool captive latching devices, ie captive thumb screws, quarter turn latches etc**.** Do not specify or approve access panels that are unhinged and/or retained by sheet metal screws.

14. Require contractors to provide a listing of the HVAC filters for each piece of equipment along with their dimensions (width, height and thickness) and types (permanent/washable, throwaway, etc)

15. Do not use plastic preinsulated pipe for buried dual temperature water distribution; use preinsulated copper pipe. **HDPE is acceptable for chilled water applications. (6.13.8)**

16. Do not specify mineral fiber or flexible unicellular insulation on chilled water pipes. Use rigid insulation on all pipes subject to being stepped on or damaged. Cellular

17. Use solids from water separators on all hydronic systems regardless of pipe material (steel or copper).

18. **Automatic flow control balancing valves should only be used in conjunction with piping systems employing solids from water separators, regardless of piping material. (6.26.09)**

19. Isolate "steam" mechanical rooms from building. All steam equipment is more prone to leaking, thus making the room humidity saturated. Provide the steam room with an exterior door; do not provide a door(s) to adjacent spaces. Keep electrical equipment out of this room. If possible separate steam rooms from cold equipment rooms. Minimize controls in steam mechanical rooms. Only controls necessary for equipment in the room shall be allowed. If it is convenient put controls in adjacent room. It is preferable to keep air handlers out of this room also. Do not run high pressure steam outside the steam room(ie steam entrance should be directly into steam mechanical room). Separate building for steam equipment and pumps is good. Provide exhaust fan ventilation with 20ac/hr on cooling thermostat.

20. Ventilate "hot" rooms and electrical rooms sufficient to mitigate heat gain

21. Do not ventilate cold equipment rooms. Cold equipment rooms are those rooms with chilled water pumping, cooling air handlers chillers, etc. These rooms should be unvented and with small dehumidifier. Drain condensate to floor drain or other disposal location. Summer dew point ranges from low to high 70's at Camp Lejeune causing condensation on equipment and piping.

22. Do not permit 400 series refrigerants except 407C and 410A. 400 series refrigerants are zeotropes and cause maintenance problems. **Use of 407C is discouraged, as it is a short term stop gap measure that the manufacturers can drop into basically a R22 machine. Designer shall research the availability of 410A and/or 134A equipment. If sufficient competition is available with 410A and/or 134A, prohibit the use of 407C and R22. 5.22.09**

23. Do not permit/specify engine driven refrigeration equipment.

24. Outside air intakes should be in compliance with force protection criteria, ie; minimum of 10' above finished grade.

25. A/C terminal units with compressors shall be easily removed. On water source equipment that means unions on the equipment side of the service valves.

26. Design and specify bladder type expansion tanks with automatic air relief valve on air separator.

27. Paint all dual temp and chilled water steel pipe before insulation is installed.

28. Keep in mind fall hazards when locating equipment. Provide necessary fall protection.

29. In refrigerated rooms/boxes: specify all evaporators on a condensing unit to defrost together, separate evaporator/condensing unit pairs should defrost non-concurrently.

30. Provide phase monitors on all 3 phase equipment. For chillers the following shall be included:
    a) phase unbalance protection
    b) over/under voltage protection
    c) phase loss protection
    d) Delay of break timer to delay automatic restarts
    e) non critical fault delay
    f) programmable auto/manual restart
    g) load and line side monitoring

    For all other equipment only phase loss, phase reversal, and phase unbalance need to be monitored. Reset shall be automatic upon correction of the fault.

31. On chillers and large condensing units; provide core filter dryer on suction line as available as standard option

32. On chillers and large condensing units; provide liquid and suction line service valves as available as standard option.

33. Do not permit welding on chillers. Water connections shall be by grooved coupling or flanges. Provide 16-20 mesh strainer on water inlet**.**

34. Do not permit grooved couplings in piping system other than the chiller connection. (6.13.8)

35. Extruded Tee's in copper piping are acceptable for mains 2" and larger with the branch ½ or less than the main. Joint must be brazed. (6.13.8**)**

36. Do not permit press type fittings in copper. (6.13.8)

37. Require 5 year warranty on compressor parts. Require 5 year warranty on labor if available.

38. DUCT WORK: specify and draw 45 degree expanded throat take offs with balance damper for all supply run outs to diffusers and grills. Do not permit flexible duct runs

39. Pump Packages: In general do not specify pump/heat exchanger packages. Most of our mechanical rooms are on the smallish side. Pump packages require maintenance space on all sides. If specifying a pump package, designer must work out general lay out of package and mechanical room to ensure maintenance access.

40. Circulating pumps for hot water, chilled water, or dual temperature shall be inline pumps when pumps are installed in noise sensitive areas, or when redundant pumps are used. Other wise base mounted pumps shall be used. For inline pumps 5 hp and larger include rigging points for maintenance.

41. **When a partial renovation of a building HVAC system re-uses existing piping, specify the contractor to clean and flush the existing piping. (1.8.10)**

42. In buildings where cooling is not available 12 months/year, consider the use of ductless split systems for conference rooms. Consider the use of Package Terminal Heat Pumps for high internal heat spaces such as server rooms.

43. When installing LP or natural gas fired equipment, if the total load is less 1.2 million btu input, specify multiple boilers/water heaters that each have an input of less than 400,000 btu/hr. At 400,000 btu/hr input the boiler or water heater becomes a utility boiler that entails increased surveillance, inspection and maintenance. Under 400,000 btu/hr input the equipment is simply a heating appliance with no maintenance requirements

44. The design for LP gas tanks shall be as follows:
    a) construction contractor to provide:
    i. 6" thick concrete slab, 6'x8' for 500 gallon tank, 6'x16' for 1000 gallon tank (6.10.9)
    ii. Underground gas line to stub up through oversized sleeve in slab, 3"from edge
    iii. 1st stage regulator
    iv. Protective bollards, 7'long, 4" schedule 40 galvanized steel, concrete filled, 3' bury with concrete encased, paint bright yellow/black with 4" stripes.
    v. Make tank hook up
    vi. Purchase at construction contractor's expense LP gas for start up, and construction period.
    b) Camp Lejeune will arrange rental, including placement, but not hook up, of the tank. Camp Lejeune will contract for tank fill up after BOD of project.
    c) Designer shall specify size of the tank (typical sizes are 123, 500, & 1000 gallon), size and location of the concrete pad, and placement/number of protective bollards. Bollards shall be place to protect from the grass cutters (each open corner), and nearby traffic (may require intermediate bollard spacing). Design shall comply with all applicable codes. As a reminder, 500 gallon tank shall be

d) AROICC will notify Camp Lejeune metering & LP tank inspector (currently Brian Soo @ 545-9222) of the need/timing of tank placement, and tank fill after BOD.

45. **On LP systems, first stage regulator is located at the LP tank and should be set for 10 psig. The second stage regulator should be located on the exterior of the building wall in a protected location. Provide a building shut off valve on all systems. (1.19.2010).**

CONTROLS

46. Avoid use of economizers (dry bulb or enthalpy). High humidity and poor control reliability prohibit success with economizers except in extremely high internal load buildings.
47. Direct Digital Control (DDC) systems are the preferred HVAC control systems for new and replacement control systems.

48. Where DDC is not practical, such as with small unitary equipment, use Smart Thermostats

49. CO2 sensors and outside air modulation should be considered in facilities with highly varying occupancies.

50. Specify that pneumatic control devices be able to withstand 30 psi without damage.

51. Control valve actuators shall be spring return normally open on preheat coils and other coils subject to freezing, spring return closed on hot water converters, and spring return closed on outside air dampers**.** (10.22.08)

52. Specify individual scheduling for air handlers. Specify a gradual (progressive) startup and a gradual (progressive) shut down of air handlers. A sudden startup or shut down of the entire building is too fast for chiller controls to react and sometimes causes safety trips.

PLUMBING

53. Lubrication oil lines should not be installed below building floor slabs. **It is preferred that lubrication oil lines be installed overhead. If this is not possible or desirable by the customer, lines** within service bays should be installed in trenches with removable tops. **(6.26.9)**

54. Install shop air compressors in accessible locations with appropriate space for periodic service. Shop air compressors **are serviced by the building occupants and** (6.26.09) should not be installed within mechanical rooms since occupant access is prohibited by base maintenance. Shop air compressors should be provided with sufficient cooling ventilation. Install air compressors associated with building HVAC controls within mechanical rooms.

55. Air compressor receivers over 5 cubic feet (37.4 gal) are unfired pressure vessels that must under go hydrostatic and operational tests witnessed by the base boiler inspector. (5.19.8)

56. Air Compressors should be mounted on vibration pads/mounts. Specify/show flexible connectors on the piping. (10.22.08**)**

57. Where practical provide hose bibs near all HVAC coils for wash down/cleaning purposes.

58. Provide floor drains in all mechanical rooms.

59. Provide trap primers on all floor drains except locations that are expected to get regular use thru out the year. **Trap primer shall be pressure type installed on a cold water line, and shall not be installed on a flush valve.(2.27.9)**

60. Provide sectional shut off valves for domestic hot & cold water for each bathroom (group).

61. Do not permit lever type control handles on pressure balance shower valves in BEQ's. This type of handle invites the user to pull for volume control, thereby breaking the handle.

62. Avoid frost proof hose bibs.

63. Provide strainers on RPZ back flow preventers**.**

64. Double Check and RPZ type back flow preventers (BFP) shall be tested/certified by the installing contractor prior to BOD. Add the following paragraph to any specification section that includes a BFP(10.22.08).

3.X Back Flow Preventer Certification: After installation all double check and reduce pressure zone type back flow preventers shall be inspected, tested and certified by a certified tester. Submit tester certification and Test Data Certification Sheet**.**

65. Extruded Tee's in copper piping are acceptable for mains 2" and larger with the branch ½ or less than the main. Joint must be brazed. (6.13.8)

66. Do not permit rolled grooved connections in domestic water copper piping.

67. Combination waste & vent is discouraged. Make use of circuit venting where appropriate.

68. Drain lines serving commercial dishwashers should be high silicone cast iron. Drains serving low temperature mild acid such as carbonated beverage machine drains should be PVC. Indicate on the drawings drain line material.

69. Domestic water piping shall be type L copper for above ground and type K copper for below grade. Do not permit press fittings. For O&M projects cross linked Polyethylene (PEX) is permitted when largest pipe can be served by 1" PEX. (5.19.8)

STEAM

70. Meters are required for steam, water and electrical service to MWR facilities and all other reimbursable customers.

71. **Avoid (5.19.8)** steam pits within mechanical rooms. Steam lines should be counter flowed from an exterior manhole.

72. Steam condensate receiver pumps should be steam pressure powered. Do not use electric duplex condensate pumps. ~~Servicing electric duplex condensate pumps cause an overlap of responsibility between the electrical and mechanical trades.~~(1.25.10)

73. Minimize use of steam pits. Those required must be raised 18 inches (450 mm) above finish grade and equipped with a full grated top. Steam pits are required for the connection and valving of building service lines. Drip legs can be direct buried with steam trap above ground in a "doghouse" if the steam pit is not required for other reasons. Steam pits are required at low points and end of mains in order to gravity drain condensate for cold start up of distribution system.

74. Do not use FRP pipe for buried steam condensate lines. Use schedule 80 black steel pipe in condensate systems.

75. Steam tunnels and trenches are preferred by base utilities over direct buried preinsulated steam and condensate systems. Trench tops may double as a sidewalk where appropriate.

76. **Direct buried steam and condensate piping shall be drainable, dryable and testable. Do not include thermal performance testing or sensors (ie. Delete from guide specification). Edit the testing specification as follows: Socket welded pipe does not need to be tested. As an alternative to radiographic testing, the butt welds may be ultrasonically tested. The report shall be similar to that of the radiographic exam, i.e., examiner shall sign and date report, defects and location shall be noted, weld shall be graded acceptable or unacceptable, etc. Welded connections shall not be covered until the government selects 10% of the connections to be tested. (5.26.09)**

77. Use externally pressurized bellows expansion joints when inline expansion in steam lines is required and where loops cannot be utilized. Slip tube expansion joints are acceptable but not preferred over externally pressurized bellows joints.

78. Provide check valves and test valves at all steam condensate drip stations.

79. Base operating steam pressures are as follows:

Steam Plant	Steam Pressure
Plant 1700	150 psi (1034 kPa)
Plant AS4151	150 psi (1034 kPa)
Plant G650	100 psi (690 kPa)
Plant M625	100 psi (690 kPa)
Plant RR15	50 psi (345 kPa)
Plant PP2615	50 psi (345 kPa)
Plant M230	50 psi (345 kPa)
Plant BB9	100 psi (690 kPa)
Plant NH100	100 psi (690 kPa)

80. Specify steam control valve actuators that can withstand heat conducted from steam lines and equipment. Do not specify, or approve, hydraulic powered actuators in steam applications.

81. Install blow down valves on all strainers.

82. It is preferred to distribute hot water thru out building or building complex for heating in lieu of direct steam heat.

83. Insulate pipes with rigid insulation where pipes are subjected to being stepped on or damaged, such as low above ground lines and steam pits; cellular glass insulation is preferred.

84. Specify flange gaskets to be metal spiral wound metal ASME B16.20.

85. Pump Packages: In general do not specify pump/heat exchanger packages. Most of our mechanical rooms are on the smallish side. Pump packages require maintenance space on all sides. If specifying a pump package, designer must work out general lay out of package and mechanical room to ensure maintenance access. (12.31.07)

86. All steam pressure powered pumps (PPP) shall have a direct acting pressure regulator on the motive steam. Provide pressure gages on the motive steam line and the condensate collection system. Regulator to be set for 20 psi higher than the condensate back pressure. Regulator shall be 20' from PPP, or the line between the regulator and the pump shall be oversized. (12.31.07)

87. Ensure that all steam heated equipment with modulating steam control valves have vacuum breakers, air vents, and gravity drain to a condensate receiver. Show sufficient details to ensure contractor pipes accordingly. The mechanical room plan shall also allow for this. If a pumping trap is required, show it on the drawing. (12.31.07**)**

FIRE PROTECTION

88. Require as built shop drawings of sprinkler systems both as a printed copy on mylar and as an electronic file on CD in Autocad.dwg 2000 version. (12.31.07)
89. **Interim policy for fire protection systems in Hadnot Point, industrial, and French Creek Areas (does not include Wallace Creek): Camp Lejeune has planned projects to increase system pressures from 50-60 psi to 70-80 psi. All fire protection systems that require fire pumps shall be designed to operate without the fire pumps with a 70 psi system pressure. The exception to this is if UFC requirements can not be met even with the higher pressure. (1.19.2010)**

SWIMMING POOLS (5.10.09)

91. Swimming pool chemistry and filters are monitored by PW Utilities and pools shall be equipped as followings:

1) Pool shall have pool controller that automatically monitors and feeds sodium hypochlorite and sulfuric acid, and backwashes the filter.

a) Controller shall read ORP or free chlorine, and PH.
b) Controller shall transmit free chlorine, and PH values to the corresponding water plant via radio.
c) Pool water temperature shall also be sensed and transmitted on indoor pools.

d) Controller shall transmit a master alarm to the corresponding water plant via radio in the event of high or low ORP or PH levels, no sensor water flow, and elapsed chemical feed alarm.
e) Chemical feed system shall be interlocked to shut off in the event of no pool circulation water flow.
f) The preferred pool controller is Bec System 7.
g) Electronics shall have a 60 minute battery backup.

2) Filter backwash shall have manual over-ride such that the filters can be backwashed in the event of controller failure.

3) Normal pool water waste shall be to the sanitary sewer, with a bypass to the storm sewer. This can be used to empty pool after dechlorination. **A dechlorinator shall be installed. (7.2.09)**

4) A normally energized duplex receptacle needs to be installed near the chemical feed pumps to manually feed chemicals in the event of pool controller failure. **If chemical feed is controlled by energizing/de-energizing the receptacle supplying the feed pumps, each pump shall have a separate, independent, and labeled receptacle. (7.2.09)**

5) Minimum chemical storage for an indoor Olympic size pool shall be 300 gallons of sodium hypochlorite, and 150 gallons of sulfuric acid. **Chemical storage shall be proportional to pool size. Outdoor pools require increased storage capacity. All chemical storage tanks shall have secondary containment. Chemical rooms shall be mechanically vented, dedicated to chemical storage and large enough to increase the storage by 50%. Chemical rooms shall be located with easy access by delivery tanker truck. Entrances to chemical room shall be labeled with Hazmat Placard. (7.2.09)**

6) Do not use brass saddles at chemical injection points. Use PVC.

7) Do not locate normally serviced equipment such as pumps, backflow preventers, lint traps, etc in pits. **Equipment that requires regular operation, service, or maintenance shall not be located in confined spaces. (7.2.09)**

8) The contractor shall modify the front end software at the water plant to receive and display the new pool.
a) Wallace creek recreation center shall transmit to the building 20 water plant.
b) The wounded warrior pool shall transmit to the building 670 water plant.

9) Swimming pools shall comply with 15A NCAC 18.A2500, (North Carolina Rules for Public Swimming Pools), with the following exception:

a) Do not provide an integral vacuum system as called for in 15A NCAC 18A.2518(g). The pool chemistry is maintained by the PW Utilities. The cleaning is done by the pool

operators. We do not want pool operators to have access to the pump room, which would be necessary if an integral vacuum system were installed.

10) Filter rooms should have a pedestrian door and an 8'x8' roll up door for forklift and pallet access. Provide differential pressure gage across each filter to be easily read while standing in front of filter. (7.2.09)

D306001-1.1 DIRECT DIGITAL CONTROLS (DDC)

Provide a complete Direct Digital Control (DDC) system for the facility. Provide a DDC system which will communicate with the existing base wide Energy Monitoring and Control System.

Provide complete direct digital control (DDC) systems which will communicate with the existing DDC/EMCS system. The existing centralized Camp Lejeune DDC system was manufactured by Johnson Controls and is the Johnson NAE system. The DDC systems shall be fully compatible with and shall fully communicate with the existing Johnson NAE system. (The Camp Lejeune Public Works Design Branch will be involved in programming their central control system to monitor the facilities via LAN connections.) The systems shall utilize electronic equipment controllers. The DDC system serving the facilities shall be designed to fully, automatically restart any and all HVAC systems in the event of power outages. Provide battery back-up on all DDC control panels.

A central DDC terminal located in the mechanical room shall monitor all control points within the facilities. Control set points shall be available for resetting in the following three ways: (1) in the mechanical rooms of the respective facilities, (2) at the central DDC terminal, and (3) via the centralized Camp Lejeune DDC system.
The existing Energy Management and Control System (EMCS) at Camp Lejeune is an enterprise system that actively receives energy and building condition information from multiple sources and provides load shedding, electric metering, alarming, trending, scheduling, set point adjustment, device communications status of all SBC and TCU for maintenance personnel. This EMCS receives Real Time Pricing utility data and automatically manages to this site's base load profile. Provide a complete fully BACnet Open Protocol compatible Direct Digital Control (DDC) system. The DDC system shall be capable of controlling and monitoring all spaces and all HVAC systems. The manufacturer's control system shall have a successful, proven, in use history of at least 2 years. The DDC control system object configuration and communication shall be totally native BACnet Open protocol with no other programming language protocol, interface, or gateways utilized, except as required by the Project documents. Modify existing DDC systems including associated equipment and accessories. Manufacturer's products, including design, materials, fabrication, assembly, erection, examination, inspection, and testing shall be in accordance with ASME B31.1 and NFPA 70, except as modified herein or indicated otherwise. Provide the DDC systems to maintain stable temperature control and all other conditions as indicated. The end-to-end accuracy of the system, including temperature sensor error, wiring error, A/D conversion, and display, shall be 1 degree F or less. Provide a supervisory building controller (SBC) and license files to allow communication between the DDC system and the station's existing EMCS system. The existing station EMCS system is Johnson Controls and incorporates Metasys Extended Architecture Engine (NAE) System that communicates over the Facility maintenance Ethernet communications network. The existing EMCS Central server is located at Building 24. Provide all necessary hardware, drivers, software, material, and equipment, which shall allow communication between the SBC and DDC upper level controllers. Provide an N2 building bus capable of connecting to an N1 Ethernet TCP/IP Level 1 network. The new DDC system naming nomenclature shall be compatible with the existing Johnson Control system. The new DDC system via the site building controller shall be capable of upload/download from the central server at Building 24. The existing Johnson Control system shall have the capability to load manage the new DDC system.

Provide sufficient quantity of digital controllers to perform all climate control, energy management, and alarm functions. All material used shall be currently in production.
Subject to the preferences of Camp Lejeune Public Works, the contractor shall update the existing Johnson Controls server in Building 24 to incorporate and integrate the new DDC system. The update requirements include but are not limited to: graphics control package of the new DDC system and programming of all load management functions. The contractor

shall fully test and verify all levels of control and communication of all the DDC system controllers from the Johnson Controls ECMS server in Bldg 24. In the event Camp Lejeune Public Works decides to carry out (on their own) any of the requirements of this paragraph, the contractor shall be free from said requirements.
The SCIF area ambient conditions shall be monitored continuously for overheat and extreme humidity conditions. In addition to normal alarm reporting, alarm signals shall be sent to user-designated telephone numbers of pertinent base personnel.
Provide electronic controls for remote, terminal HVAC equipment.
The entire DDC system shall be designed in accordance with the *EMCS Equipment and Points Nomenclature for Camp Lejeune* (included in Part 6 Attachments).

In addition, the following requirements shall be met for the facilities:
Provide a complete Direct Digital Control (DDC) system for the facility's HVAC systems. The DDC system shall be accessible from the Internet. Provide a front-end web-connected CPU or server. If a CPU is used, mount it in a locked, power-ventilated cabinet adjacent to the building front-end control panel(s). Provide the CPU or server with a battery backup UPS device. Locate UPS devices in a separate locked, power-ventilated cabinet. Locate all front-end DDC equipment in a clean, temperature-controlled, computer friendly environment. All DDC controllers, CPU's, servers, workstations, and interface devices provided shall comply with and communicate using the ASHRAE Standard 135-2004, BACnet Protocol for Building Automation and Control Networks. The DDC system shall use BACnet objects and properties for all physical inputs and outputs, and BACnet read and write services for all network communications and device-to-device algorithms. Coordinate the BACnet network and device addressing with the Government BAS owner to ensure unique addresses. Provide BACnet Product Information Conformance Statements (PICS) for each DDC controller and BACnet device.
The controls sub-contractor for this project shall be regularly engaged in the design and installation of BACnet DDC systems (for building HVAC systems) similar to the size and scope of this project, shall have been a representative of the proposed control system manufacturer for a minimum of two years, have a staffed office within a 50-mile radius of the project location, and shall have performed design and installation of DDC systems for a minimum of 5 years. The controls sub-contractor shall ensure that their installing electricians have a copy of, read, and understand the mechanical sheets of the contract's design construction drawings, in addition to the control drawings prepared by the sub-contractor. Provide the DDC programming and graphics using Standard English units of measure, not metric.
The control system shall be completely electric/electronic, no pneumatics.
Provide DDC programming to view, modify, alarm, trend, schedule, and override device parameters via direct connection, and remotely via telephone line or LAN connection. Provide DDC programming routines in simple, easy-to follow logic. Provide detailed text comments describing each routine.

In addition, provide each routine screen with its applicable as-built written sequence of operation. Design control drawings shall include the following:
1. Detailed control system scope-of-work and installation notes describing the various components that will be provided (controllers, sensors, valves, dampers, etc.).

2. A diagram of the control system communication architecture, including network and device addressing.

3. Control valve and control damper schedules, including actuators and

linkages.

4. DDC point schedule including point description, point type (BI, BO, AI, or AO), alarm requirements, trend requirements, and additional information such as type of sensor, location, etc.

5. A detailed control diagram for each piece of HVAC equipment receiving DDC. Diagrams shall show all related control components in their respective locations, valve and damper normal positions, fluid flow directions, and point types (BI, BO, AI, or AO).

6. A detailed written sequence of operation for each piece of HVAC equipment. Fully describe every operating routine (occupied operation, night setbacks, optimal start, etc.).

Show floor plans in the DDC graphics to scale. Where feasible, use the project's AutoCAD design drawings, purged of extraneous detail. Each piece of HVAC equipment shall be controlled by the DDC. Do not provide hard-wire interlocks between fans or pumps. Provide software interlocks instead. However, freeze protection thermostats, duct smoke detectors, and other safety type devices shall be hard-wire interlocked with their associated piece of HVAC equipment.

Provide each piece of HVAC equipment with a hand-off-auto switch. The hand position shall energize the equipment directly under all conditions except activation of a freeze protection thermostat, duct smoke detector, or other safety type device. Ensure safety conditions also de-energize equipment in the auto position. Where feasible, provide air handlers and terminal units with discharge/supply air temperature sensors.

Operate the building circulating pumps serving hot and chilled water loops whenever the outdoor air temperature is below 35 deg. F. Provide control routines to automatically start back-up pumps (or other HVAC equipment) if the primary device fails. Rotate primary and back-up HVAC equipment monthly with a lead/lag control routine. Start/stop pumps via the DDC, not the chiller controller. Provide reset routines (based on outdoor air temperature or zone demand) for hot and chilled water loop temperature set points. Provide meters monitored by the DDC on the building's incoming propane, water, and electric utilities. Set up trend reports to record data daily and store values in the front-end DDC computer. Provide flow rate meters monitored by the DDC for central hot and chilled water flows and central air handling unit air flows. When not used for direct control, provide wall mounted carbon dioxide and relative humidity sensors in strategic occupied spaces for monitoring purposes.

Provide hot water and chilled water valve actuators that fail open to the coil via a spring return. Provide each actuator with a self-locking male/female quick-connect type plug in the wiring serving each valve operator, for emergency use, to allow manually disconnecting power to the device, sending it to its fail position (without disrupting any other unit control). Locate each plug exposed in plain view. Provide chilled water control valve actuators and linkages that can be easily and fully insulated and vapor sealed at the valve connection.

Provide alarms for the DDC points. Provide point cross-referencing, time delays, and differentials to prevent nuisance alarms. Analyze the alarms after the system is in operation and make additional adjustments to reduce/eliminate nuisance alarms. Trend all possible data points. Where

possible, provide trends based on change-of-value for sensor readings, motor statuses, and actuator positions. Once the trend buffer is full, the oldest data will be purged from the list when new data is added. Store the maximum amount of data feasible. Provide trend reports for each DDC point after the system has been in operation and collected its buffer of data points. Analyze the trends for anomalies, inconsistencies, and operating problems such as equipment running when it is not supposed to, valve hunting, inability to maintain set point, and incorrect start-up or shutdown sequences. The final DDC system Operation & Maintenance manuals shall include as-built drawings of the DDC communication wiring in the building showing the exact installed configuration/routing of the communication wiring daisy chain, including LAN's, switches, routers, and addressing exactly as installed.

Provide at least one registered copy (on mfr's original CD) of the control system software. If a hardware key is required, provide the manufacturer's largest capacity "master" key, allowing full access to the maximum number of controllers. Provide a minimum of six additional "technician level" hardware keys for distribution among the naval base mechanics and their laptop computers. If the control manufacturer uses software keys or registered "seats" instead of hardware keys, provide a minimum of six registered software seats, in lieu of keys. Regardless of the control manufacturer and its software license protection method, the Government shall receive the manufacturer's complete software, at least one full-access capability, and at least six limited-access capabilities.

For the DDC system provided under this contract, include at no additional cost to the Government, all firmware and system software upgrades (including patches and updates) as they become commercially available for a minimum of two years starting from contract acceptance. In the submitted control system O&M manuals, provide an itemized list of the firmware and system software. Include original release dates, version numbers, part numbers and serial numbers, and beginning and ending warranty dates. Provide a statement that firmware and system software upgrades shall be provided without cost during the two-year period. Provide an additional statement that the manufacturer's telephone technical support shall be provided without cost for five years from contract acceptance. The control system manufacturer shall provide toll-free telephone technical support at no additional cost to the Government for a minimum of five years from contract acceptance. Technical support shall be furnished by highly experienced service technicians of the controls manufacturer, and be available during normal weekday working hours. Include the toll-free technical support telephone number in the contract's control submittals. Absence of toll-free post-acceptance telephone technical support shall be sufficient reason for disapproval of a proposed control system manufacturer.

The point-of contact for existing DDC systems at the MCB Camp Lejeune is:
Public Works Department, EMCS
Kyle Brown, PE
Telephone: (910) 451-7264

EMCS Equipment and Points Nomenclature for Camp Lejeune

No.	Nomenclature	Description
	EQUIPMENT	
1	AHU	Air Handling Unit
2	B	Heating Water Boiler
3	B	Steam Boiler
4	C	Chiller
5	CCC	Closed Circuit Cooler
6	CCT	Closed Circuit Tower
7	COM RM	Communication Room
8	CP	Condenser Water Pump
9	CRAC	Computer Room Air Conditioner
10	CT	Cooling Tower
11	CTP	Cooling Tower Pump
12	CTRL PNL	Control Panel
13	CU	Air Cooled Condensing Unit
14	CWP	Chilled Water Supply Pump
15	DECAHP	Defense Commissary Agency HP
16	DHW	Domestic Hot Water
17	DPR	Damper
18	DTS	Dual Temperature System
19	DWP	Domestic Hot Water Pump
20	ECT	Evaporative Cooling Tower
21	EF	Exhaust Fan
22	EST	Elevated Storage Tank
23	FCU	Fan Coil Unit
24	FLTR	Filter
25	GLBT	Ground Level Booster Tank
26	HP	Heat Pump (On Ground)
27	HWP	Hot Water Pump
28	HWT	Hot Water Tank
29	HV	Heating and Ventilating Unit
30	HX	Steam to Hot Water Converter
31	LS	Lift Station
32	LP-PMP	Loop Pump
33	MAD	Mixed Air Damper
34	MAU	Make-up Air Unit
35	MZ	Multizone Unit
36	OA	Outside Air
37	OAT	Outside Air Temperature
38	PACU	Package Unit
39	PHP	Packaged Heat Pump (On Ground)
40	PX	Plate Exchanger
41	RA	Return Air
42	RAF	Return Air Fan
43	RTHP	(RTU) Packaged Rooftop Heat Pump Unit
44	RTMZ	Rooftop Multizone Unit
45	RTU	Rooftop Unit (Packaged DX)
46	RVS-VLV	Reversing Valve
47	SA	Supply Air

EMCS Equipment and Points Nomenclature for Camp Lejeune

No.	Nomenclature	Description
	EQUIPMENT	
48	STP	Secondary Treatment Plant
49	SV	Solenoid Valve/Steam Valve
50	TS	Temperature Sensor
51	TWAC	Thru-Wall Air Conditioner
52	TWHP	Thru-Wall Heat Pump
53	UH	Unit Heater
54	VAV	Variable Air Volume
55	WAC	Window Air Conditioner
56	WS	Work Station
57	WSHP	Water Source Heat Pump
58	WTP	Water Treatment Plant
59	WP	Well Pump
60	ZD	Zone Mixing Damper

EMCS Equipment and Points Nomenclature for Camp Lejeune

No.	Nomenclature	Description
	POINTS	
61	AHU-DHUM	Air Handling Unit Dehumidifier
62	AHU-OVRRD	Air Handling Unit Override
63	ALM-CMD	Alarm Command
64	ALM-HORN	Alarm Horn
65	ALM-RST	Alarm Reset
66	ALM-SIL	Alarm Silence
67	BLR-A	Boiler Alarm
68	BLR-C	Boiler Command
69	BLR-S	Boiler Start
70	BOILER-EN	Boiler Enable
71	BYPD-C	Bypass Damper Command
72	C-?	Chiller Status
73	CD-T	Cold Deck Temperature
74	CH-CMD	Chiller Command
75	CH-OVR	Chiller Override
76	CH-ALM	Chiller Alarm
77	CH-DP	Chiller Differential Pressure
78	CH-FLO-S	Chiller Flow Switch
79	CHILLER-EN	Chiller Enable
80	CHS-T	Chiller Supply Temperature
81	CHW-DP	Chilled Water Differential Pressure
82	CHW-FLOW	Chilled Water Flow
83	CHW-SYS ENABLE	Chilled Water System Enable
84	CLG-C	Cooling Command
85	CLGMAX	Cooling Maximum
86	CLG-NITE	Cooling Night Set Point
87	CLG-SP	Cooling Set Point
88	CLG-VLV	Chilled Water Valve Status
89	CLG-VLV	Chilled Water Valve Operation
90	COND1-S	Condenser 1 Status
91	COND2-S	Condenser 2 Status
92	COOL1-C	Cooling Stage 1 Command
93	COOL2-C	Cooling Stage 2 Command
94	CTFAN-C	Cooling Tower Fan Command
95	CTFAN-S	Cooling Tower Fan Status
96	CWR-T	Chilled Water Return Temperature
97	CWS-GPM	Chilled Water Supply GPM
98	CWS-T	Chilled Water Supply Temperature
99	DHW-SET	Domestic Hot Water Set Point
100	DHWS-T	Domestic Hot Water Supply Temperature
101	DHW-TANK	Domestic Hot Water Tank Temperature
102	DHW-VLV	Domestic Hot Water Steam Valve
103	ELEC-HEAT	Electric Heat
104	FLTR-DP	Filter Differential Pressure
105	FLTR-S	Air Filter Differential
106	HD-T	Hot Deck Temperature
107	HTG1-C	Heating Stage 1 Command

EMCS Equipment and Points Nomenclature for Camp Lejeune

No.	Nomenclature	Description
	POINTS	
108	HTG2-C	Heating Stage 2 Command
109	HTGMAX	Heating Maximum Set Point
110	HTG-NITE	Heating Night Set Point
111	HTG-SP	Heating Set Point
112	HTGV-CMD	Heating Command
113	HTG-VLV	Heating Valve
114	HUM-SPT	Humidity Set Point
115	HW-ENA	Hot Water Enable
116	HWP-1-C	Hot Water Pump 1 Command
117	HWP-SPT	Hot Water Pump Set Point
118	HWP-SS	Hot Water Pump Status
119	HWR-T	Hot Water Return Temperature
120	HW-SET	Hot Water Reset Set Point
121	HWS-FL	Hot Water Supply Flow
122	HWS-P	Hot Water Supply Pressure
123	HWS-SPT	Hot Water Supply Set Point
124	HWS-T	Hot Water Supply Temperature
125	HW-SYS ENABLE	Hot Water System Enable
126	HWVLV-C	Hot Water Valve Command
127	HX-VLV	Heat Exchanger Valve
128	IA-H	Indoor Humidity Sensor
129	INST-DMD	Instantaneous Demand
130	INTV-DMD	Interval Demand
131	LOOPR-T	Loop Return Temperature
132	LOOPS-T	Loop Supply Temperature
133	LPMP-1-C	Loop Pump 1 Command
134	MAD-CMD	Mixed Air Damper Command
135	MA-T	Mixed Air Temperature
136	MAX-CLG	Maximum Cooling Set Point
137	MAX-HTG	Maximum Heating Set Point
138	MIN-HTG	Minimum Heating Set Point
139	MIN-OAD	Minimum Outside Air Damper
140	OA-CFM	Outside Air Cubic Feet Per Minute
141	OAD-C	Outside Air Damper Position
142	OAD-SET	Outside Air Damper Set Point
143	OAF-C	Outside Air Fan Command
144	OAF-S	Outside Air Fan Status
145	OA-H	Outside Humidity Sensor
146	OA-RH	Outside Air Relative Humidity
147	OA-T	Outside Air Temperature
148	OCC-CLG	Occupied Cooling
149	OCC-HTG	Occupied Heating
150	OCCTIME	Occupied Time (Schedule)
151	OCCTIMER	Occupied Timer (Schedule)
152	OCLG-SP	Occupied Cooling Set Point
153	OHTG-SP]	Occupied Heating Set Point
154	OHWP-SPT	Occupied Hot Water Sump Set Point

EMCS Equipment and Points Nomenclature for Camp Lejeune

No.	Nomenclature	Description
	POINTS	
155	PH-LEV	PH Level
156	PH-SET	PH Set Point
157	PWR-FAIL	Power Fail
158	PWR-MTR	Power Meter
159	RAD-C	Return Air Damper Position
160	RAF-C	Return Air Fan Command
161	RAF-S	Return Air Fan Status
162	RA-T	Return Air Temperature
163	REV-VLV	Reversing Valve
164	RM-T	Room Temperature
165	SA-SMKD-C	Smoke Detector Command
166	SA-SMK-S	Smoke Detector Status
167	SA-SP	Supply Air Set Point
168	SA-T	Supply Air Temperature
169	SETPNT1	Set Point 1
170	SETPNT2	Set Point 2
171	SF-C	Supply Fan Command
172	SF-S	Supply Fan Status
173	SF-VFD	Supply Fan Variable Frequency Drive
174	SHDN-CMD	Shutdown Command
175	SMK-S	Duct Smoke Detector
176	STM-C	Steam Command
177	STM-S	Steam Pressure
178	STM-T	Steam Temperature
179	STM-VLV	Steam Valve Operation
180	STM-VLV	Steam Valve Status
181	SUMMER	Summer Mode
182	SUMWIN-C	Summer/Winter Command
183	TANK-L-A	Tank Level
184	TOTAL-KW	Total Kilowatt (kW)
185	TOTLFLOW	Total Flow
186	TRIPLOCK	Trip Lock Out
187	TWR-CMD	Tower Command
188	UH-ENA	Unit Heater Enable
189	UH-SPT	Unit Heater Set Point
190	UNOCC-CLG	Unoccupied Cooling
191	UNOCC-HTG	Unoccupied Heating
192	VFD-S	Variable Frequency Drive Status
193	WINDO-AC	Window Air Conditioner
194	WINTER	Winter Mode
195	WSHP-SPT	Water Source Heat Pump Set Point
196	ZNHTG-SP	Zone Heating Set Point
197	ZN-T	Space/Zone Temperature

E ERA ES E ER R

1. ALL EXTERIOR ELECTRICAL UNDERGROUND AND OVERHEAD IS NEW AND SHALL BE PROVIDED BY THE CONTRACTOR, UNLESS OTHERWISE INDICATED.
2. ALL EXISTING EXTERIOR ELECTRICAL UNDERGROUND AND OVERHEAD SHALL REMAIN, UNLESS INDICATED TO BE REMOVED.

E EC R CA E E D E ER R VER EAD

SYMBOL	DESCRIPTION
●	NEW POWER POLE
○	EXISTING POWER POLE TO REMAIN
⊗	REMOVE EXISTING POWER POLE.
	DOWN GUY AND ANCHOR.
	EXISTING DOWN GUY AND ANCHOR.
	REMOVE EXISTING DOWN GUY AND ANCHOR.
▼	NEW POLE MOUNTED SINGLE PHASE TRANSFORMER
▽	EXISTING POLE MOUNTED SINGLE PHASE TRANSFORMER.
—12.47—	NEW 12.47 KV, CIRCUIT.
—12.47—	EXISTING 12.47 KV, CIRCUIT.
—X—12.47—X—	REMOVE EXISTING 12.47 KV, CIRCUIT.
—SL—	NEW OPEN 120/240 VOLTS, SECONDARY CIRCUIT.
—SL—	EXISTING OPEN 120/240 VOLTS, SECONDARY CIRCUIT.
—X—SL—X—	REMOVE EXISTING OPEN 120/240 VOLTS, SECONDARY CIRCUIT.
—TV—	NEW CABLE TELEVISION CABLE CIRCUIT.
—TV—	EXISTING CABLE TELEVISION CABLE CIRCUIT.

E EC R CA E E D E ER R DER R D

SYMBOL	DESCRIPTION
— — — — —	UNDERGROUND DUCTBANK, CONCRETE ENCASED U.O.N. DESCRIPTION AS INDICATED.
— —UP— —	UNDERGROUND CONDUIT. CABLE AND CONDUIT AS INDICATED. "UP" INDICATES UNDERGROUND PRIMARY. SEE TYPICAL DESIGNATION BELOW. CONCRETE ENCASED FOR "UP" AND "US". DIRECT BURIED FOR USL.
— —US— —	EXISTING UNDERGROUND CONDUIT. "US" INDICATES UNDERGROUND SECONDARY. SEE TYPICAL DESIGNATION BELOW. WIRING AND CONDUIT SIZE AS INDICATED.
—X—USL—X—	REMOVE EXISTING UNDERGROUND CIRCUIT. ABANDON CONDUIT IN PLACE U.O.N. "USL" INDICATES UNDERGROUND STREET LIGHTING. SEE TYPICAL DESIGNATION BELOW.
——— G ———	GROUND CONDUCTOR. (SIZE AS NOTED).

TYPICAL DESIGNATIONS TO BE USED IN CONJUNCTION WITH CONDUIT SYMBOLS ——

- UP – UNDERGROUND PRIMARY
- US – UNDERGROUND SECONDARY
- UC – UNDERGROUND COMMUNICATIONS
- USL – UNDERGROUND STREET LIGHTING

MANHOLE	MANHOLE OR HANDHOLE AS NOTED. TYPE AS INDICATED. SEE MANHOLE OR HANDHOLE DETAILS, SHEET.
HANDHOLE	
MANHOLE	SAME AS ABOVE, EXCEPT EXISTING.
HANDHOLE	
T	PAD MOUNTED TRANSFORMER. RATING AS INDICATED. THICKEST LINE INDICATES FRONT.
	PANEL BOARD.
	AREA/STREET LIGHTING POLE WITH LUMINAIRE. TYPE AS INDICATED.
	EXISTING AREA/STREET LIGHTING TO REMAIN
	REMOVE AREA/STREET LIGHTING POLE AND LUMINAIRE.
XA	EXTERIOR LIGHTING FIXTURE TYPE. SEE "EXTERIOR LIGHTING FIXTURE SCHEDULE", SHEET SE–506

E EC R CA E E D S E EDA RA

SYMBOL	DESCRIPTION
	15kV, 200 AMP LOAD BREAK ELBOW
	15kV, POLE MOUNTED FUSED CUT OUT
	TRANSFORMER.
	10kV LIGHTNING ARRESTER
	FUSED SWITCH.
M	KWH METER PER BASE REQUIREMENTS
	GROUND

ABBREV A S

A	AMPERE
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
C	CONDUIT
CB	CIRCUIT BREAKER
CKT	CIRCUIT
CL	CLASS
EC	EMPTY CONDUIT
EPR	ETHYLENE PROPYLENE RUBBER
EQUIP	EQUIPMENT
ETR	EXISTING TO REMAIN
EXIST	EXISTING
GND	GROUND
HID	HIGH INTENSITY DISCHARGE
HPS	HIGH PRESSURE SODIUM
KVA	KILO–VOLT–AMPERES
KW	KILO–WATTS
KV	KILO–VOLTS
LTG	LIGHTING
MCB	MAIN CIRCUIT BREAKER
MFR	MANUFACTURER
MLO	MAIN LUGS ONLY
MTD	MOUNTED
NEC	NATIONAL ELECTRICAL CODE
N	NEUTRAL
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
PE	PHOTOELECTRIC SWITCH
PL	PROPERTY LINE
PNL	PANEL
PNLBD	PANELBOARD
ø	PHASE
P	POLE
RECEPT	RECEPTACLE
REQ'D	REQUIRED
TBB	TELEPHONE BACKBOARD
TYP	TYPICAL
UP	UNDERGROUND PRIMARY
US	UNDERGROUND SECONDARY
USL	UNDERGROUND STREET LIGHTING
UC	UNDERGROUND COMMUNICATIONS
UTV	UNDERGROUND TELEVISION
UON	UNLESS OTHERWISE NOTED
V	VOLT(S)
WP	WEATHERPROOF

S EE DE

ES–001	ELECTRICAL SYMBOLS AND NOTES
ES–301	FRENCH CREEK – SITE ELECTRICAL PLAN
ES–302	FRENCH CREEK – SITE ELECTRICAL PLAN
ES–303	FRENCH CREEK – SITE ELECTRICAL PLAN
ES–304	FRENCH CREEK – SITE ELECTRICAL PLAN
ES–309	FRENCH CREEK – SINGLE LINE DIAGRAM
ES–501	SITE ELECTRICAL DETAILS
ES–502	SITE ELECTRICAL DETAILS
ES–503	SITE ELECTRICAL DETAILS
ES–504	SITE ELECTRICAL DETAILS
ES–505	SITE ELECTRICAL DETAILS
ES–506	ELECTRICAL SITE SCHEDULES
ES–603	SITE PANEL SCHEDULES – FC
ESL–103	FRENCH CREEK PHOTOMETRIC

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SYM	DESCRIPTION	DATE	APPR

NAVFAC

001–002

REGISTERED PROFESSIONAL ENGINEER DMITRIY S. NATYAGAEV No. E 17320 Exp. 06/30/10 ELECTRICAL STATE OF CALIFORNIA

04–09–10

DES	DRW	CHK
FIRE PROTECTION		
BRANCH MANAGER		
CHIEF ENG/ARCH		

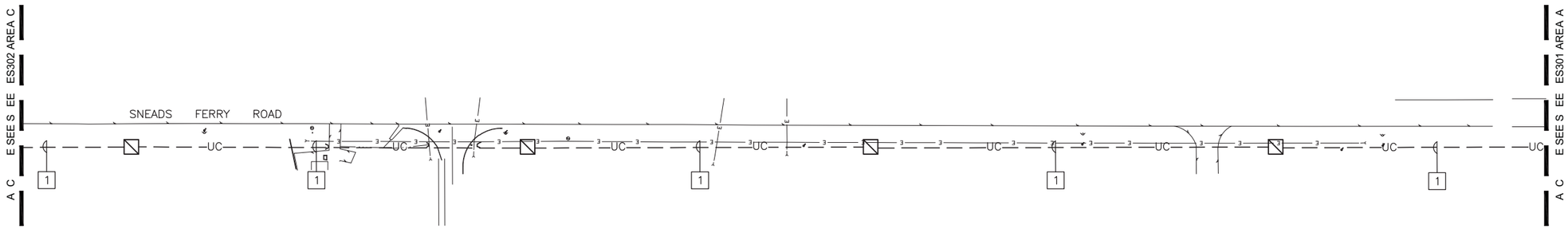
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
MARINE CORPS NORTH CAROLINA IPT
MCB CAMP LEJEUNE

NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
<<NAVAL STATION – NORFOLK, VIRGINIA>>
JACKSONVILLE, NORTH CAROLINA
FY09 BACHELOR ENLISTED QUARTERS
FRENCH CREEK P-1017 P-1047

Electrical Site Legend, Notes & Abbreviations

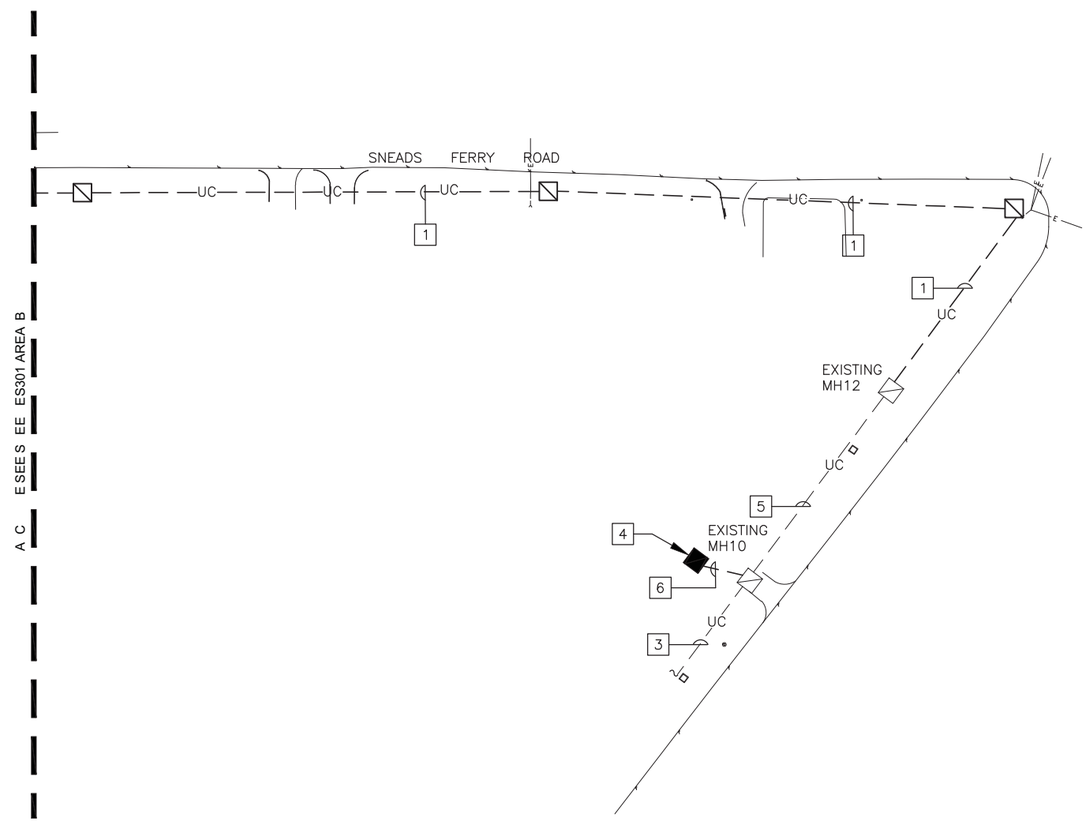
CODE ID. NO.	SIZE D
SCALE:	AS INDICATED
MAXIMO NO.	–
JOB ORDER NO.	–
WORK ORDER NO.	–
CONSTR. CONTR. NO.	N40085–09–R–3215
NAVFAC DRAWING NO.	12537261
SHEET	OF –
SHEET NO.	ES–001

17 MAY 2010 FRENCH CREEK 100% SUBMITTAL



artial Site Electrical lan Frenc Cree Site Area B

Scale: 1"=80'



artial Site Electrical lan Frenc Cree Site Area A

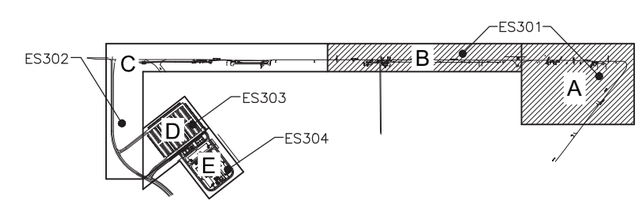
Scale: 1"=80'

Key ote

1. NEW COMMUNICATION DUCTBANK: (4) 4" CONDUITS WITH 300 PAIR COOPER PE39 AND 96 STRANDS SMFO.
2. EXISTING POLE S60; ADD NEW CROSS ARM, RELOCATED THE EXISTING NEUTRAL, ADD NEW GUY. CONNECT NEW LINE TO LOWER CIRCUIT.
3. EXISTING COMMUNICATION DUCT BANK; INSTALL 96 STRANDS SMFO TO THE NEW TELEX BUILDING.
4. EXISTING PHONE PEDESTAL (COOPER P.O.C.).
5. EXISTING COMMUNICATION DUCT BANK. INSTALL 96 STRANDS SMFO AND 300 PAIR COPPER PE-39.
6. NEW 2" CONDUIT WITH 300 PAIR COPPER COMMUNICATION CABLE.

eneral ote

1. FOR POLE SCHEDULE SEE SHEET ES302



Key lan Frenc Cree Site

Not To Scale

0 40 80 160

1 inch = 80 ft. Horizontal

ra ic Scale

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SA D E , CA, 92123
.E E C S .C

APPR	DATE	DESCRIPTION	SYM

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001-002

REGISTERED PROFESSIONAL ENGINEER DMITRIY S. NATHANSON No. E 17320 Exp. 06/30/10 ELECTRICAL STATE OF CALIFORNIA

05-17-2010

DES	DRW	CHK
FIRE PROTECTION		
BRANCH MANAGER		
CHIEF ENG/ARCH		

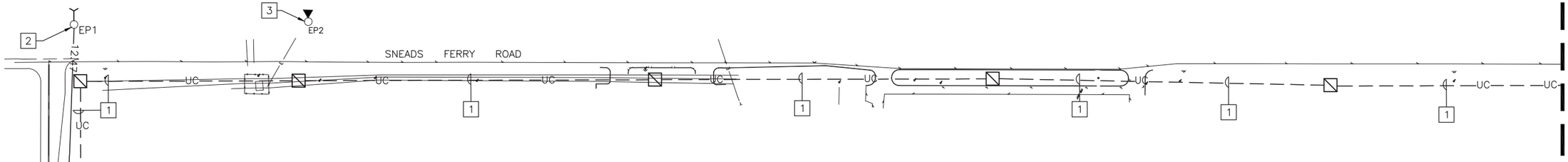
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
MARINE CORPS NORTH CAROLINA IPT
MCB CAMP LEJEUNE

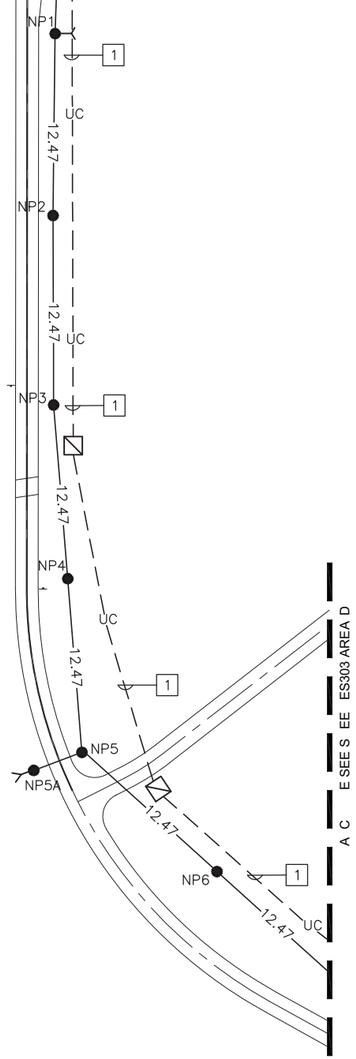
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
<<NAVAL STATION - NORFOLK, VIRGINIA>>
JACKSONVILLE NORTH CAROLINA
FY09 BACHELOR ENLISTED QUARTERS
FRENCH CREEK P-1017 P-1047

French Creek - Site Electrical Plan

CODE ID. NO.	SIZE D
SCALE: AS INDICATED	
MAXIMO NO.	--
JOB ORDER NO.	--
WORK ORDER NO.	--
CONSTR. CONTR. NO.	N40085-09-R-3215
NAVFAC DRAWING NO.	12537261
SHEET	OF --
SHEET NO.	ES-301

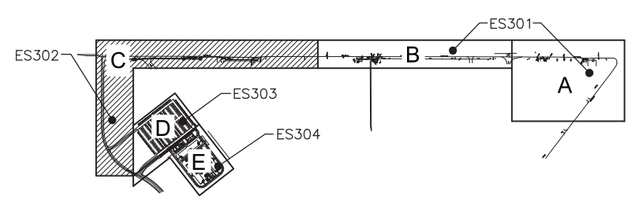
17 MAY 2010 FRENCH CREEK 100% SUBMITTAL





Key ote

1. NEW COMMUNICATION DUCTBANK: (4) 4" CONDUITS WITH 300 PAIR COOPER AND 96 STRANDS SMFO.
2. EXISTING POLE S60; ADD NEW CROSS ARM, RELOCATED THE EXISTING NEUTRAL, ADD NEW GUY. CONNECT NEW LINE TO LOWER CIRCUIT.
3. INSTALL NEW POLE MOUNTED TRANSFORMER FOR TRAFFIC LIGHT.



Key Plan - French Creek Site
Not To Scale

artial Site Electrical lan Frenc Cree Area C
Scale: 1"=80'

POLE SCHEDULE (FRENCH CREEK BEQ'S, ES-300 SERIES PLANS)			
POLE NUMBER	NEW/EXISTING	SIZE/CLASS	NOTES
NP-1	NEW	40C3	15AR3-N, GROUND, CONNECT TO EXISTING CIRCUIT
NP-2	NEW	40C3	15AR3-N, GROUND
NP-3	NEW	40C3	15AR3-N, GROUND
NP-4	NEW	40C3	15VDDE3-N, SPAN GUYS, GROUND
NP-5	NEW	40C3	15AR3-N, GROUND
NP-5A	NEW	40C3	DOWN GUYS, SPAN GUYS
NP-6	NEW	40C3	15AR3-N, GROUND
NP-7	NEW	40C3	15AR3-N, GROUND
NP-8	NEW	40C3	15AR3-N, GROUND, GUY, (1)XL-9, (1)XL-21
NP-9	NEW	45C3	15AR3-N, (1)XL-9, (1) XL-21, GROUND, 25kVA TR, PANEL SL6
NP-10	NEW	40C3	15AR3-N, GROUND, DOWN GUYS, UG TERMINAL (OH-31), (1) XL-9, (1)XL-21
NP-11	NEW	40C3	15AR3-N, (1)XL-9, (1) XL-21, GROUND, 15kVA TR, PANEL SL7
NP-12	NEW	40C3	(1)XL-9, (1)XL-21, GROUND
NP-13	NEW	30C3	(1)XL-9, (1)XL-21, GROUND
NP-14	NEW	30C3	(1)XL-9, (1)XL-21, GROUND
NP-15	NEW	30C3	(1)XL-9, (1)XL-21, GROUND
NP-16	NEW	30C3	(1)XL-9, (1)XL-21, GROUND

0 40 80 160
1 inch = 80 ft. Horizontal
ra ic Scale

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SA DE , CA, 92123
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APPR	DATE	DESCRIPTION	SYM

NAVFAC

001-002
REGISTERED PROFESSIONAL ENGINEER
DMITRY S. NATHANSON
No. E 17320
Exp. 06/30/10
ELECTRICAL
STATE OF CALIFORNIA
05-17-2010

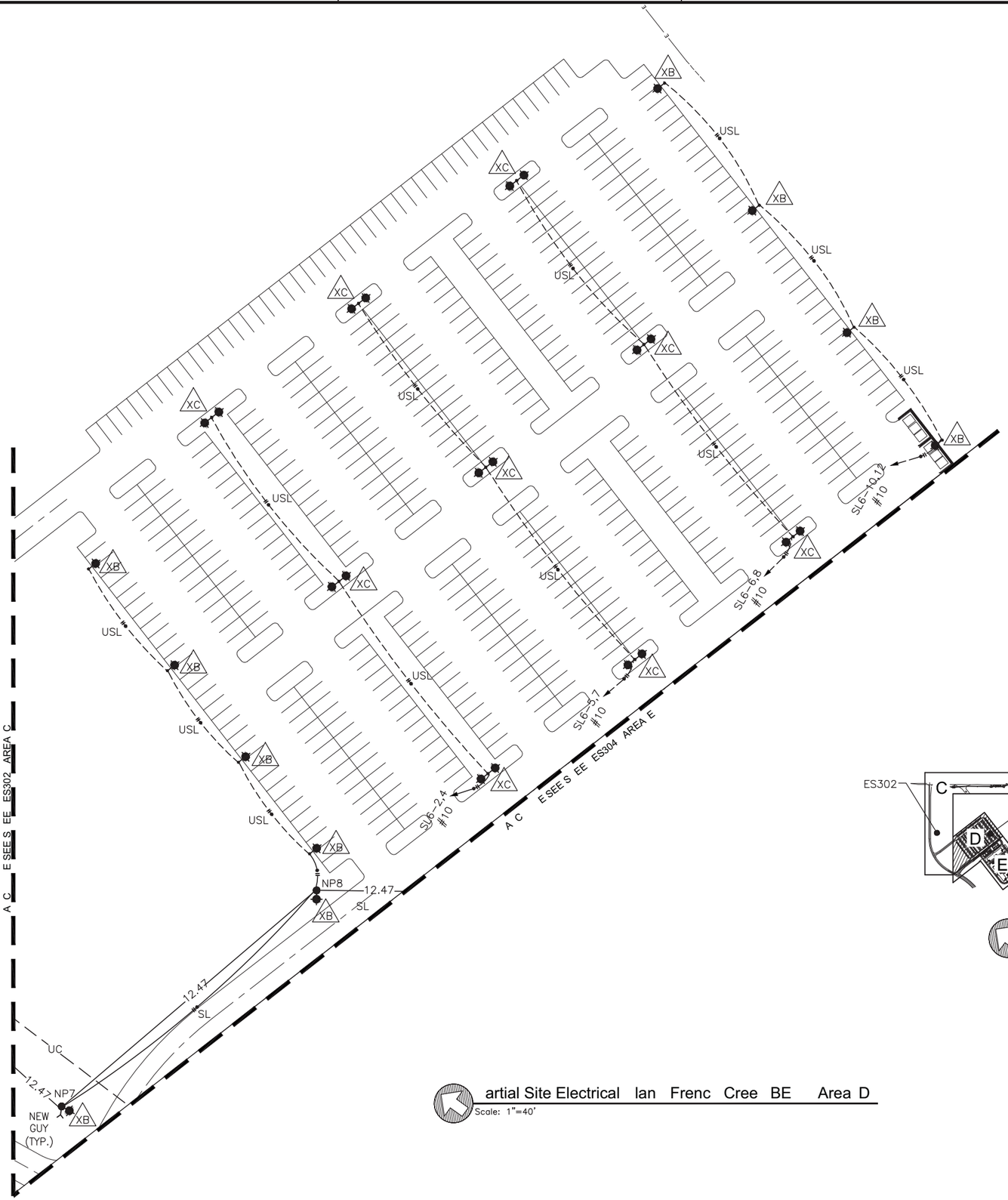
DES | DRW | CHK
FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
MARINE CORPS NORTH CAROLINA IPT
MCB CAMP LEJEUNE
NAVAL FACILITIES ENGINEERING COMMAND
<<NAVAL STATION - NORFOLK, VIRGINIA>>
JACKSONVILLE, NORTH CAROLINA
FY09 BACHELOR ENLISTED QUARTERS
FRENCH CREEK P-1017 P-1047

French Creek - Site Electrical Plan/Pole Schedule

CODE ID. NO. | SIZE D
SCALE: AS INDICATED
MAXIMO NO. --
JOB ORDER NO. --
WORK ORDER NO. --
CONSTR. CONTR. NO. N40085-09-R-3215
NAVFAC DRAWING NO. 12537261
SHEET OF --
SHEET NO. ES-302

17 MAY 2010 FRENCH CREEK 100% SUBMITTAL



artial Site Electrical lan Frenc Cree BE Area D

Scale: 1"=40'

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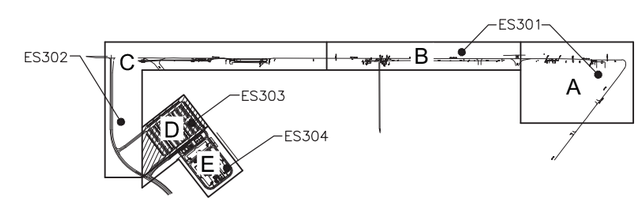
1. FOR POLE SCHEDULE SEE SHEET ES302



Key lan Frenc Cree Site

Not To Scale

0 20 40 80

1 inch = 40 ft. Horizontal

ra ic Scale

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APPR	DATE	DESCRIPTION	SYM

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001-002

REGISTERED PROFESSIONAL ENGINEER DMITRIY S. NATHANSON No. E 17320 Exp. 06/30/10 ELECTRICAL STATE OF CALIFORNIA

05-17-2010

DES	DRW	CHK
FIRE PROTECTION		
BRANCH MANAGER		
CHIEF ENG/ARCH		

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
MARINE CORPS NORTH CAROLINA IPT
MCB CAMP LEJEUNE

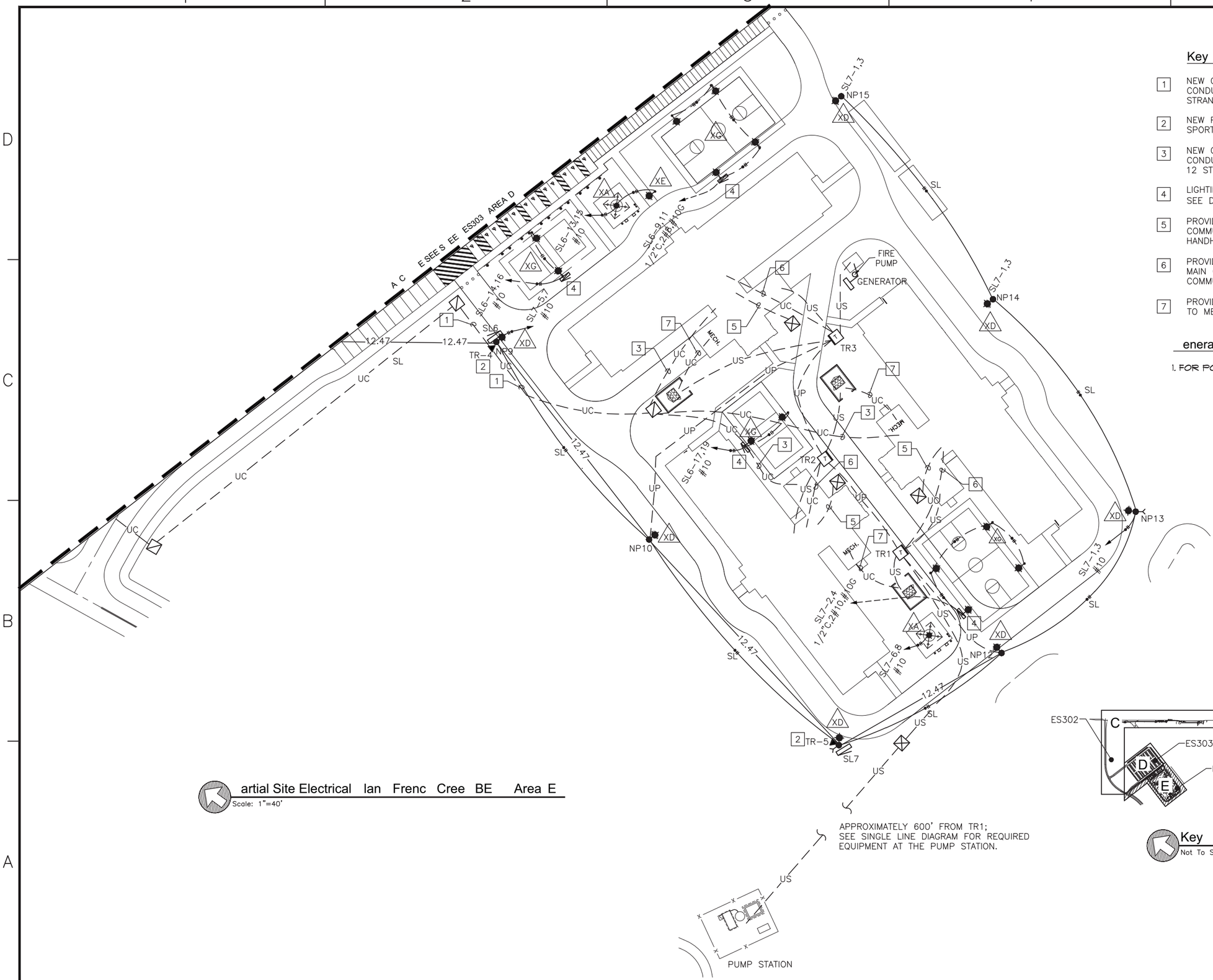
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
<<NAVAL STATION – NORFOLK, VIRGINIA>>

FY09 BACHELOR ENLISTED QUARTERS
FRENCH CREEK P-1017 P-1047
JACKSONVILLE NORTH CAROLINA

French Creek - Site Electrical Plan

CODE ID. NO.		SIZE D
SCALE: AS INDICATED		
MAXIMO NO.	–	
JOB ORDER NO.	–	
WORK ORDER NO.	–	
CONSTR. CONTR. NO.	N40085-09-R-3215	
NAVFAC DRAWING NO.	12537261	
SHEET	OF –	
SHEET NO.	ES-303	

17 MAY 2010 FRENCH CREEK 100% SUBMITTAL



Key ote

1. NEW COMMUNICATION DUCTBANK: (4) 4" CONDUITS WITH 300 PAIR COOPER AND 96 STRANDS SMFO.
2. NEW POLE MOUNTED TRANSFORMER FOR SPORTS COURT AND PARKING LOT LIGHTS
3. NEW COMMUNICATION DUCT BANK. (2) 4" CONDUITS WITH 25 PAIR PE-39 COPPER & 12 STRANDS SMFO.
4. LIGHTING CONTROLS FOR SPORT LIGHTING. SEE DETAIL #1 ON SHEET ES-506.
5. PROVIDE 4'' STUBOUT FROM MAIN COMMUNICATION ROOM TO A TYPE 9 HANDHOLE FOR CATV.
6. PROVIDE 2" CONDUIT AND PULL STRING TO MAIN COMMUNICATION ROOM FOR COMMUNICATION WIRING.
7. PROVIDE (2)2" CONDUITS WITH PULL STRING TO MECH ROOM FOR CONTROL WIRING.

eneral ote

1. FOR POLE SCHEDULE SEE SHEET ES302

artial Site Electrical lan Frenc Cree BE Area E
Scale: 1"=40'

Key lan Frenc Cree Site
Not To Scale

0 20 40 80
1 inch = 40 ft. Horizontal
ra ic Scale

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5402 R FF R AD, S E 210A
SA D E , CA, 92123
.E E C S .C

APPR	DATE	DESCRIPTION

NAVFAC

CS Ca

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REGISTERED PROFESSIONAL ENGINEER DMITRIY S. NATHANSON No. E 17320 Exp. 06/30/10 ELECTRICAL STATE OF CALIFORNIA
05-17-2010

DES | DRW | CHK
FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
MARINE CORPS NORTH CAROLINA IPT
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NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
<<NAVAL STATION - NORFOLK, VIRGINIA>>
JACKSONVILLE, NORTH CAROLINA
FY09 BACHELOR ENLISTED QUARTERS
FRENCH CREEK P-1017 P-1047

French Creek - Site Electrical Plan

CODE ID. NO. | SIZE D
SCALE: AS INDICATED
MAXIMO NO. –
JOB ORDER NO. –
WORK ORDER NO. –
CONSTR. CONTR. NO. N40085-09-R-3215
NAVFAC DRAWING NO. 12537261
SHEET – OF –
SHEET NO. ES-304

17 MAY 2010 FRENCH CREEK 100% SUBMITTAL

Interior Design Policy: Best Value Determinations Mar 2009

FAR 8.405-1 States the designer shall review at least three schedule contractors through GSA (NAVSUP BPAs). In addition to price, when determining best value, the designer may consider the factors such as special features, trade in considerations, life cycle analysis, warranty, maintenance, past performance, sustainability, comfort, delivery, training needed, technical qualifications, compatibility, and administrative costs as part of the Best Value Determination (BVD) (Enclosures 1 and 2)

If other than price is the deciding factor for selection, the designer must document the decision in a narrative paragraph as part of the BVD.

The designer must sign the BVD forms under Submitting Official

BVD REQUIREMENTS

$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 $100,000 or less: for any procurement in the FF&E package with a value greater than $3,000 and $100,000 or less, the contractor's interior designer shall always review pricing from at least three BPA holders/manufacturers as well as UNICOR. UNICOR must always be solicited which is done by sending an email with the requirements and evaluation criteria. In addition to the review of published list prices, the contractor's interior designer must confirm the pricing with the vendor. The BVD form (Enclosure 1) must be completed and submitted for all FF&E procurements greater than $3,000 and $100,000 or less.

Greater than $100,000: The contractor's interior designer shall solicit proposals from all BPA holders under the applicable group for FF&E procurements greater than $100,000. UNICOR must always be solicited. The contractor's interior designer shall 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 (Enclosure 2) must be completed and submitted for all FF&E procurements greater than $100,000 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. UNICOR contact information to obtain pricing or send solicitations is enclosed. (Enclosure 3)

This policy is in effect immediately for any projects awarded after 1 Mar 09. Any questions can be directed to Peggy Noland, CID, Supervisory Interior Designer, NAVFAC MIDLANT at 757-445-3187 or margaret.noland@navy.mil.

Enclosure (1)

BEST VALUE DETERMINATION GUIDELINES
$3,000 - $100,000

(Schedule Purchases are subject to FAR 8.4, DFARS 208.4, and DFARS PGI Supplement 208.405-70)

- FAR 8.4 required that you make a best value determination before placing Multiple Award Schedule (MAS) orders above the micro-purchase limit (currently $3,000).
- The Navy Furniture BPAs shall be the primary source for FF&E. Refer to Specification Section E20.
- For orders between $3,000 and $100,000, review pricing from at least three sources and UNICOR. (FAR 8.405-1(c))
- Seek additional price discounts from the contractor offering the best value. (FAR 8.405-1(d))

1. Brief Description of Item, System or Component to be Procured:

2. Did you review the required number of sources under the BPA and/or Federal Supply Schedule? YES ☐ NO ☐

3. Identify the Navy Furniture BPA or other Federal Supply Schedule utilized or indicate not applicable.

4. Was UNICOR included in the review? YES ☐ NO ☐

5. List the name(s) and contract number(s) of contractor(s) who were considered:

List three or more contractors' names, contract numbers and business size reviewed.

6. Identify the contractor recommended as the best value.

7. When you sought additional price reductions, were they received? YES ☐ NO ☐

8. Identify price with discounts for the recommended best value contractor.

9. Is installation, site preparation, design or ancillary services included in this project? YES ☐ NO ☐ If yes, be sure that the installation, site preparation, design or ancillary services are included as separate line items in each quote.

10. Are you selecting the lowest priced item? YES ☐ NO ☐ If no, indicate in addition to price, those factors listed below, considered in your decision.

- ☐ Price
- ☐ Special features required in effective program performance:
- ☐ Trade-in considerations
- ☐ Probable life of the item selected as compared with that of a comparable item: .
- ☐ Warranty considerations:
- ☐ Maintenance availability
- ☐ Past performance
- ☐ Environmental and energy efficiency considerations
- ☐ Comfort/suitability of the item:
- ☐ Delivery terms
- ☐ Your administrative costs
- ☐ Training needed or provided
- ☐ Technical qualifications
- ☐ Compatibility with existing furniture / Products / Technology (circle appropriate category)
- ☐ Other (*specify*):

11.
Best Value Determination:
A narrative justification for each box checked above for other than low price selection must be attached. Describe the evaluation factor, how the recommended best value contractor's offer met or exceeded the standard for each factor, and why the offeror represents the best value to the Government compared to the other offerors.

SUBMITTING OFFICIAL (PRIME CONTRACTOR'S INTERIOR DESIGNER)
In accordance with FAR 8.404(b), all agency specific regulations and statutes applicable to this purchase are attached. I have reviewed the findings and documentation attached and I have affirmatively determined them to be complete and accurate.

Name:_____Title: _____ Date: _____

Telephone: _____ Email: _____

Signature:_____

CUSTOMER REPRESENTATIVE
I have reviewed the agency findings and documentation supplied and I have affirmatively determined them to be in the best interest of the Government.

Name:_____Title: _____ Date: _____

Telephone: _____ Email: _____

Signature:_____

BASE PROPERTY OFFICER
I have reviewed the agency findings and documentation supplied and I have affirmatively determined them to be in the best interest of the Government.

Name:_____Title: _____ Date: _____

Telephone: _____ Email: _____

Signature:_____

SUBMITTING OFFICIAL**
In accordance with FAR 8.4, all agency specific regulations and statutes applicable to this requirement are attached. I have reviewed the findings and documentation attached and I have affirmatively determined them to be complete and accurate.

Name:_____Title: _____ Date: _____

Telephone: _____ Email: _____

Signature:_____

CONTRACTING OFFICER
I have reviewed the agency findings and documentation supplied and I have affirmatively determined them to be in the best interest of the Government.

Name:_____Title: _____ Date: _____

Telephone: _____ Email: _____

Signature:_____

** This should be the Contracting Officer's Technical Representative, Project Manager or a Receiving Officer.

Enclosure (2)

BEST VALUE DETERMINATION GUIDELINES
Greater than $100,000

(Schedule Purchases are subject to FAR 8.4, DFARS 208.4, and DFARS PGI Supplement 208.405-70)

- FAR 8.4 required that you make a best value determination before placing Multiple Award Schedule (MAS) orders above the micro-purchase limit (currently $3,000).
- The Navy Furniture BPAs shall be the primary source for FF&E. Refer to Specification Section E20.
- For orders greater than $100,000, all BPA holders for the applicable schedule shall be given an opportunity to compete for the requirement. In addition, UNICOR shall also be solicited. (DFARS PGI 208.405-70)
- Seek additional price discounts from the contractor offering the best value. (FAR 8.405-1(d))

1. Brief Description of Item, System or Component to be Procured:

2. Were all BPA holders and/or Federal Supply Schedule holders given the opportunity to propose on the requirement?
   YES ☐ NO ☐

3. Identify the Navy Furniture BPA or other Federal Supply Schedule utilized or indicate not applicable.

4. Was UNICOR included in the review? YES ☐ NO ☐

5. Provide evidence of affording all BPA holder and/or Federal Supply Schedule holders the opportunity to compete. Also, provide evidence that UNICOR was solicited.

6. <u>List the name(s) and contract number(s) of contractor(s) who responded to the request for proposal for this requirement:</u>
   <u>List contractors' names, contract numbers and business size for those who responded.</u>

7. Provide copies of all quotes received and reviewed.

8. Identify the contractor recommended as the best value.

9. When you sought additional price reductions, were they received? YES ☐ NO ☐

10. Identify price with discounts for the recommended best value contractor.

11. Is installation, site preparation, design or ancillary services included in this project? YES ☐ NO ☐
If yes, be sure that the installation, site preparation, design or ancillary services are included as separate line items in each quote.

12. Are you selecting the lowest priced item? YES ☐ NO ☐
If no, indicate in addition to price, those factors listed below, considered in your decision.

- ☐ Price
- ☐ Special features required in effective program performance:
- ☐ Trade-in considerations
- ☐ Probable life of the item selected as compared with that of a comparable item: .
- ☐ Warranty considerations:
- ☐ Maintenance availability
- ☐ Past performance
- ☐ Environmental and energy efficiency considerations
- ☐ Comfort/suitability of the item:
- ☐ Delivery terms
- ☐ Your administrative costs
- ☐ Training needed or provided
- ☐ Technical qualifications
- ☐ Compatibility with existing furniture / Products / Technology (circle appropriate category)
- ☐ Other (*specify*):

13.
Best Value Determination:
A narrative justification for each box checked above for other than low price selection must be attached. Describe the evaluation factor, how the recommended best value contractor's offer met or exceeded the standard for each factor, and why the offeror represents the best value to the Government compared to the other offerors.

SUBMITTING OFFICIAL (PRIME CONTRACTOR'S INTERIOR DESIGNER)
In accordance with FAR 8.404(b), all agency specific regulations and statutes applicable to this purchase are attached. I have reviewed the findings and documentation attached and I have affirmatively determined them to be complete and accurate.

Name:_____Title: _____ Date: _____

Telephone: _____ Email: _____

Signature:_____

CUSTOMER REPRESENTATIVE
I have reviewed the agency findings and documentation supplied and I have affirmatively determined them to be in the best interest of the Government.

Name:_____Title: _____ Date: _____

Telephone: _____ Email: _____

Signature:_____

BASE PROPERTY OFFICER
I have reviewed the agency findings and documentation supplied and I have affirmatively determined them to be in the best interest of the Government.

Name:_____Title: _____ Date: _____

Telephone: _____ Email: _____

Signature:_____

SUBMITTING OFFICIAL**
In accordance with FAR 8.4, all agency specific regulations and statutes applicable to this requirement are attached. I have reviewed the findings and documentation attached and I have affirmatively determined them to be complete and accurate.

Name:_____Title: _____ Date: _____

Telephone: _____ Email: _____

Signature:_____

CONTRACTING OFFICER
I have reviewed the agency findings and documentation supplied and I have affirmatively determined them to be in the best interest of the Government.

Name:_____Title: _____ Date: _____

Telephone: _____ Email: _____

Signature:_____

** This should be the Contracting Officer's Technical Representative, Project Manager or a Receiving Officer.

P1267 Equipment Schedule											
Contractor Equipment Schedule											
Item #	Qty	Description	Location	CFCI	GFCI	GFGI	Remarks	Model #	Volts	AMPS	Phase
1	4	Remote Pulper	See ****	MILCON			Hobart (remote system)	WPR-1200	208	16.5	3
2	2	Three Compartment Sink	Dishroom	MILCON							
3	2	Soiled Dishtable	Dishroom	MILCON							
4	Lot	Dish Rack Dolly	Dishroom			x					
5	2	Flight Type Dish Machine	Dishroom	CEQ			Hobart	FT-920	480	91.5	3
6	2	Exhaust Hood	Dishroom	MILCON			Engineer Determines Electrical				
7	2	Sorting Table	Dishroom	MILCON							
8	Lot	Bussing Cart	Dishroom			x					
9	2	Hose Reel	Dishroom	CEQ							
10	2	Utility Sink	Dishroom	MILCON							
11	1	Floor Trough	Dishroom	MILCON							
12	1	Hand Sink	Dishroom	MILCON							
13	1	Hot Water Booster Heater	Dishroom	CEQ			Component of Dishwasher (note **)	FT-920	208	66.6	3
14	2	Pass-Through Heated Cabinet	Serve Line	MILCON			Traulsen	RIH132LP-FHS	120/208	7.8	1
15	2	Pass-Through Refrigerator	Serve Line	MILCON			Traulsen	RRI132LPUT-FHS	120	8.3	1
16	1	Check In Desk	Serve Line	CEQ							
17	3	Point Of Sales Terminal	Serve Line	CEQ			Main Line, Fast Food,& Take Out		115		1
18	Lot	Tray Cart	Serve Line			x					
19	3	Menu Display	Serve Line	CEQ			2 Digital Boards inside with software/hardware		110		1
20	1	Roll-In Heated Cabinet	Serve Line	MILCON			Traulsen	RIH232L-FHS	208	15.5	1
21	1	Roll-In Refrigerator	Serve Line	MILCON			Traulsen	RRI132LUT-FHS	115	12.8	1
22	2	Display Case Refrigerated	Serve Line	CEQ							
23	Lot	Tray Cart	Serve Line			x					
24	4	Drop-In Cold Pan	Serve Line	CEQ					120		1
25	4	Drop-In Hot/Cold Well	Serve Line	CEQ					120	7	1
26	3	Griddle, Gas	Serve Line	CEQ			Vulcan	972A	120	5	1
27	2	Exhaust Hood	Serve Line	MILCON			Engineer Determines Electrical				
28	8	Dish Dispenser	Serve Line			x					
29	1	Serving Counter	Serve Line	CEQ							
30	1	Serving Counter Fast Food	Serve Line	CEQ			custom				
31	1	Counter Fast Food Support	Serve Line	CEQ							
32	4	Salad Bar Counter	Serve Line	CEQ							
33	2	Self Serve Ice Cream Boxes	Serve Line	CEQ							
34	1	Beverage Bar Counter	Serve Line	MILCON			custom				
35	4	Glass Rack Dolly	Serve Line			x					
36	12	Food Guard Assembly	Serve Line	CEQ							
37	4	Glass Rack Dolly	Serve Line			x					
38	2	Juice Dispenser	Serve Line		x		Vendor		120	9.5	1
39	3	Milk Dispenser	Serve Line			x			115	2.7	1
40	2	Bread Dispenser	Serve Line			x					
41	4	Toaster	Serve Line			x	Hatco	TK-100	208	24	1
42	2	Tea Dispenser	Serve Line		x		Vendor		120/208	19.5	1
43	2	Coffee Brewer	Serve Line		x		Vendor		120	19.4	1
44	4	Airpot Coffee Dispenser	Serve Line		x		Vendor		120/208	25	1
45	3	Soda Dispenser	Serve Line		x		Vendor		120	8	1
46	3	Ice Dispenser	Serve Line	CEQ			Follet Model # HCD1400WBS		208-230	30	1
47	4	Tray And Silverware Dispenser	Serve Line			x					
48	2	Hot Chocolate Dispenser	Serve Line		x		Vendor		120	30	1
49	2	Bowl Dispenser	Serve Line			x					

50	Lot	Hand Sink	Serve Line	MILCON							
51	4	Microwave Oven	Serve Line			x			120	16.8	1
52	3	Ice Machine With Bin	See *****	CEQ			Manitowoc	SD1803W	208-230	40	1
53	1	Food Cutter	Veg Prep	CEQ			Hobart	84186	115	7	1
54	1	Blast Chiller	Veg Prep	MILCON			Traulsen	RBC100	208-230	15.1	1
55	Lot	Work Table	Veg Prep	CEQ							
56	1	Two-Compartment Sink	Veg Prep	MILCON							
57	1	Hand Sink	Veg Prep	MILCON							
58	Lot	Wall Shelf	Veg Prep	CEQ							
59	2	Conveyor Pizza Oven, Gas	Hot Prep	CEQ			Lincoln Impinger (see note ***)	1601-000-U	120	14	1
60	1	Platform Scale	Hot Prep	CEQ							
61	Lot	Corner Guard	Hot Prep	MILCON							
62	5	Roll-In Combi Oven	Hot Prep	CEQ			Hobart	CE20FD	208	103.8	3
63	2	Double Stack Convection Oven, Gas	Hot Prep	CEQ			Vulcan	SG44D	120	18	1
64	1	Floor Trough	Hot Prep	MILCON							
65	2	Work TableWith Sink	Hot Prep	MILCON							
66	1	Work Table With Fixed Overshelf	Hot Prep	CEQ							
67	2	Work Table	Hot Prep	CEQ							
68	1	Exhaust Hood	Hot Prep	MILCON			Engineer Determines Electrical				
69	4	Heated Cabinet	Hot Prep	CEQ					120	16	1
70	2	Braising Pan-40 Gal, Gas	Hot Prep	CEQ			Groen	BPM-40G	120	5	1
71	2	Floor Trough	Hot Prep	MILCON							
72	2	Two Fryer Battery With Filter, Gas	Hot Prep	CEQ			Keating (*******)	34x24BB	120	1	1
73	3	Wall Flashing	Hot Prep	MILCON							
74	1	Exhaust Hood	Hot Prep	MILCON			Engineer Determines Electrical				
75	1	Work Table	Hot Prep	CEQ							
76	1	Exhaust Hood	Hot Prep	MILCON			Engineer Determines Electrical				
77	2	Floor Trough	Hot Prep	MILCON							
78	1	Steam Jacketed Kettle-60 Gal	Hot Prep	CEQ			Groen, Non-Tilting, Direct Steam	PT-60			
79	2	Steam Jacketed Kettle-40 Gal	Hot Prep	CEQ			Groen, Non-Tilting, Direct Steam	PT-40			
80	2	Table Top Steam Jacketed Kettle 40 Qt	Hot Prep	CEQ			Groen,Tilting, Direct Steam w/ Table	TDA/1-40			
81	Lot	Mobile Pan Rack	Hot Prep			x					
82	2	Hand Sink	Hot Prep	MILCON							
83	1	Work Table With Sink	Hot Prep	MILCON							
84	1	Proofing Cabinet	Bakery	CEQ							
85	2	Baker's Scales	Bakery			x					
86	Lot	Work Table	Bakery	CEQ							
87	1	Mixer 60-Quart	Bakery	CEQ			Hobart	HL600	208	10	3
88	1	Mixer 20-Quart With Stand	Bakery	CEQ			Hobart	HL200	120	8	1
89	1	Mixer 12-Quart	Bakery	CEQ			Hobart	HL120	120	8	1
90	3	Ingredient Bin	Bakery			x					
91	2	Mobile Pan Rack	Bakery			x					
92	1	Two Compartment Sink	Bakery	MILCON							
93	3	Meat Slicer	Bakery	CEQ			Hobart	3913N	100-120	2.5	1
94	1	Hand Sink	Bakery	CEQ							
95	2	Reach In Refrigerator	See ******	CEQ			Traulsen	RHT232WUT-FHS	115	11.1	1
96	Lot	Pot and Pan Storage Shelving	Potshack	CEQ							
97	1	Hand Sink	Potshack	MILCON							
98	1	Three Compartment Sink-Power Washing	Potshack	MILCON			Hobart	TWII	208-240	18.2	1
99	1	Floor Trough	Potshack	MILCON							
100	1	Condensate Hood	Potshack	MILCON			Engineer Determines Electrical				
101	1	Flight Type Pot Washer	Potshack	CEQ			Hobart	FT-914S	480	70.8	3
102	1	Hose Reel	Potshack	CEQ							

103	1	Janitor Sink With Service Faucet	Potshack	MILCON								
104	5	Air Door-Heated	Storage	MILCON								
105	Lot	Dry Store Shelving	Storage	CEQ								
106	1	Cook Chill Walk-In Cooler	Storage	MILCON								
107	Lot	Walk-In Refrigerator Shelving	Storage	CEQ								
108	1	Evaporative Coil-Cook Chill Cooler	Storage	MILCON								
109	1	Remote Condenser Cook Chill Cooler	Storage	MILCON								
110	8	Floor Trough	Storage	MILCON			Floor Troughs Or Drains?					
111	1	Walk-In Vegetable Freezer	Storage	MILCON			Engineer Determines Electrical					
112	1	Evaporative Coil-Vegetable Freezer	Storage	MILCON			Engineer Determines Electrical					
113	1	Remote Condenser-Vegetable Freezer	Storage	MILCON			Engineer Determines Electrical					
114	1	Walk-In Vegetable Cooler	Storage	MILCON			Engineer Determines Electrical					
115	1	Evaporative Coil-Vegetable Cooler	Storage	MILCON			Engineer Determines Electrical					
116	1	Remote Condenser-Vegetable Cooler	Storage	MILCON			Engineer Determines Electrical					
117	1	Walk-In Meat Cooler	Storage	MILCON			Engineer Determines Electrical					
118	1	Evaporative Coil-Meat Cooler	Storage	MILCON			Engineer Determines Electrical					
119	1	Remote Condenser-Meat Cooler	Storage	MILCON			Engineer Determines Electrical					
120	1	Walk-In Meat Freezer	Storage	MILCON			Engineer Determines Electrical					
121	1	Evaporative Coil-Meat Freezer	Storage	MILCON			Engineer Determines Electrical					
122	1	Remote Condenser-Meat Freezer	Storage	MILCON			Engineer Determines Electrical					
123	1	Floor Trough	Storage	MILCON								
124	1	Water Filtration System	Storage	MILCON								
125	1	Bulk CO2 Tank	Storage	CEQ								
126	Lot	Dunnage Rack	Storage	CEQ								
127	Lot	Bag-In-Box System	Storage	CEQ								
128	1	Fryer Oil Collection System	Storage	MILCON			Conduit,Phone jack, and electrical only					
129	1	Remote Refrigeration Rack	Storage	MILCON								
130	1	Hose Bibb for Area Wash Down	Storage	MILCON								
131	1	Intercom/Telephone	Storage	MILCON								
132	Lot	Hose Reel	Sanitation	CEQ								
133	1	Floor Trough	Sanitation	MILCON								
134	1	Area Floor Drain	Sanitation	MILCON								
135	1	Water Press For Remote Pulper System	Sanitation	MILCON			Hobart		WP-9	208	12.6	3
136	Lot	Furniture/Blinds/Décor	Dining	CEQ								
*	GFGI = Government Furnished/Government Installed											
	CFCI = Contractor Furhished/Contractor Installed											
	GFCI = Government Furnished/Contractor Installed											
**	Must specify when purchasing FT900S											
***	Install ovens as a double stack											
****	Pulpers in veg prep, potshack, and scullery connected to remote extractor											
*****	Ice Machines in storage, bakery, and veg prep											
******	Reach In refrigerators in veg prep and bakery											
*******	Custom build 2 battery with filter											
Notes; Can change responsibility for procurement to government if necessary to stay within Bid price.												

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NAVAL FACILITIES ENGINEERING COMMAND MID-ATLANTIC
FURNITURE, FIXTURES & EQUIPMENT (FF&E) ESTIMATED COST SUMMARY

BASE:

PROJECT: **DATE:**

CODE	QTY	ITEM DESCRIPTION	MANUFACTURER	UNIT COST	TOTAL
				SUBTOTAL	
		Misc. (5%)			
		Shipping (6%)			
		Installation (13%)			
				TOTAL	

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FURNITURE PROCUREMENT DATA SHEET

_____ DIVISION

NAVAL FACILITIES ENGINEERING COMMAND

SHEET:

DATE:

PROJECT/LOCATION:			PROJECT #:
ITEM:			ITEM CODE:
FSC GRP:	PART: SECTION:	EXP: DATE: MOL:	GSA #/OPEN MARKET : FED. STOCK #:

MANUFACTURER:

ORDERING ADDRESS:

CONTRACTOR:

SHIP TO ADDRESS (if applicable):

LOCAL REP:

PHONE NUMBER:

ANY VARIANCE OR MODIFICATION OF THIS SPECIFICATION WILL BE COORDINATED THROUGH _____ DIVISION, NAVAL FACILITIES ENGINEERING COMMAND.

CONTACT:

_____, INTERIOR DESIGNER, _____NAVFACENGCOM, ___(Phone)_ _____

DESCRIPTION:	QTY:	UNIT COST:	TOTAL COST:
LOCATION OF ITEMS			
NOTES/SPECIAL INSTRUCTIONS			
TOTAL:			

FOB/REMARKS:

file name:

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FURNITURE PROCUREMENT DATA SHEET (continued)

_____ DIVISION

NAVAL FACILITIES ENGINEERING COMMAND

MANUFACTURER:

ITEM NO.:

photo of item here

FINISH:

representative finish here

file name:

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BPA	Office Furniture Vendor	Point of Contact	Phone Number	Email	Business Size
N00189-07-A-0007	Affordable Interior Systems Inc. dba AIS	Primary: Dave Morales Alternate: David Moorad	800-434-7400 703-307-0955	dmorales@ais-inc.com	Small
N00189-07-A-0013	BIF New York Inc.	Primary: Tommy Lee Alternate: Paul Chung	201-933-7777	tommy@bifnewyork.com pchung@bifnewyork.com	Small
N00189-07-A-0014	BIF New York Inc.	Primary: Tommy Lee Alternate: Paul Chung	201-933-7777	tommy@bifnewyork.com pchung@bifnewyork.com	Small
N00189-07-A-0015	Ergogenesis LLC	Primary: Ray Woodward Alternate: Lee Mauney	800-364-5299	rwoodward@ergogenesis.com lmauney@ergogenesis.com	Small
N00189-07-A-0016	Jack Knelly Office Furniture	Primary: Jack Knelly Alternate: Bob Broderrek	570-742-8210	jackknelly@verizon.net bobb@namarketinginc.com	Small
N00189-07-A-0017	Metalworks Inc. dba Great Openings	Primary: Steve Paine Alternate: Shane Pung	231-398-8282 231-895-3177	spaine@greatopenings.com spung@greatopenings.com	Small
N00189-07-A-0018	Service Products Group of Bucyrus Inc. dba Wyandot Seating	Primary: Shane Boland Alternate: Phil Snyder	410-627-0397 800-233-4974	midatlanticfurniture@comcast.net info@wyandotseating.com	Small
N00189-07-A-0019	Global Distributors Inc.	Primary: Ken Corbin Alternate: Sonya Groves	301-657-3557 877-289-4472 ext 816	kcorbin@globalgsa.com sgroves@globalindustries.com	Small
N00189-07-A-0020	Centercore Group Inc.	Primary: Kevin Singleton Alternate: Penny Vick	870-358-2500	ksingleton@centercore.com pvick@centercore.com	Small
N00189-07-A-0021	Jofco Inc.	Primary: Cheryl Dischinger	888-749-9165	cheryl.dischinger@jofco.com	Small
N00189-07-A-0022	Solution Planning & Contract Environments dba SPACE	Primary: Stacy Betts Alternate: Colette St. Louis	989-835-5151	sbetts@spaceinc.net	Small
N00189-07-A-0023	Maxon Furniture Inc	Primary: Abe Soria Alternate: David Dillard	253-740-0383 703-723-8127	soriaa@maxonmail.com dillardd@maxonmail.com	Large
N00189-07-A-0024	Teknion, Inc.	Primary: Steve Hindle Alternate:William Richards	410-300-9955 202-246-8582	shindle@tekus.com brichards@tekus.com	Large
N00189-07-A-0025	Cramer Inc.	Primary: Brian Edmonds	800-366-6700	brian@cramerinc.com	Small
N00189-07-A-0026	Haworth, Inc.	Primary: Tom Walker	616-393-3611	thomas.walker@haworth.com	Large
N00189-07-A-0028	Unicor Federal Prison Industries Inc.	Primary: Diane Stabinski Alternate: Cory Wheeland	757-812-2673 757-410-8408	diane.stabinski@oei-inc.com	Large

N00189-07-A-0029	Herman Miller, Inc.	Primary: Dave Bowes	703-946-8312	dave_bowes@hermanmiller.com	Large
N00189-07-A-0040	Trendway Corp.	Primary: Chris Silguero Alternate: Nick Pannunzio	616-399-3900	csilguero@trendway.com npannunzio@trendway.com	Small
N00189-07-A-0049	Knoll, Inc	Primary: Steve Robinson	202-973-0410	steve_robinson@knoll.com	Large
N00189-07-A-0051	Compatico Inc.	Primary: Dick Posthumus Alternate: John Rea	616-575-8307 616-575-8312	dposthumus@compatico.com jrea@compatico.com	Small
N00189-07-A-0052	Executive Furniture of Washington DC	Primary: Richard Mellish Alternate: Ann Mellish	301-622-9584	efwdc@efwdc.com efidc@prodigy.net	Small
N00189-07-A-0053	Humanscale Corp.	Primary: Theresa Donnelly Alternate: Craig Puegner	732-537-2944 952-906-1097	tdonnelly@humanscale.com cpuegner@humanscale.com	Small
N00189-07-A-0054	The Hon Company	Primary: Mike Paar	563-272-4345	paarm@honcompany.com	Large
N00189-07-A-0057	Allsteel Inc	Primary: Bill Phelan Alternate: Marian C. Moreley	800-248-2025	PhelanB@allsteeloffice.com	Large
N00189-07-A-0067	Kimball International Inc.	Primary: Drew Andrews Alternate: Mickie Emmons	301-655-7233	drew.andrews@kimball.com mickie.emmons@kimball.com	Large

BPA	Packaged Furniture Vendor	Point of Contact	Phone Number	Email	Business Size
N00189-07-A-0001	Krug Inc.	Primary: Mike Boehmer	800-265-2796 ext 203	mboehmer@krug.ca	Large
N00189-07-A-0005	DCI Inc.	Primary: Lisa Birch-Wooldridge	800-552-8286 ext 603	Lbirch-wooldridge@dcufurn.com	Small
N00189-07-A-0011	R T London Company	Primary: Gerald Barry Alternate: Abbi Adams	877-613-2012	gbarry@rtlondon.com aadams@rtlondon.com	Small
N00189-07-A-0027	Unicor Federal Prison Industries Inc.	Primary: Diane Stabinski Alternate: Cory Wheeland	757-812-2673 757-410-8408	diane.stabinski@oei-inc.com	Large
N00189-07-A-0030	Homeland Office Products and Equipment	Primary: Tom Pratt Alternate:Christina Pratt	781-829-0397	tpratt@homelandoffice.com	Small
N00189-07-A-0032	Stonehill Sales	Primary: Carol Hill Alternate: Scott Hill	845-386-1234	chill@hvc.rr.com stonehill@hvc.rr.com	Small

N00189-07-A-0033	Office Design Group Inc.	Primary: Russell Smith Alternate: Kathy Habash	949-215-5557	russell@officedesigngroup.com kathy@officedesigngroup.com	Small
N00189-07-A-0034	Facilities Solutions Group LLC	Primary: Eric zetterberg Alternate: Phil Foltman	703-234-6057 703-234-6555	eric.zetterberg@fsg-llc.com	Small
N00189-07-A-0035	Steelcase Inc.	Primary: Greg Engelsma	616-246-9082	genglsma@steelcase.com	Large
N00189-07-A-0036	Med Enterprises LLC dba K L N Steel Products	Primary: Mike Gittinger Alternate: Willie Adclck	210-227-4747 800-624-9109 ext 647	mike@kln.com willie@3mtf.com	Small
N00189-07-A-0037	New Day Office Products & Furnishings	Primary: Chuck Brady	757-398-0718	chuck@newdayoffice.com	Small
N00189-07-A-0038	Office Environments International Inc.	Primary: Dale Buch Alternate: Bill Malone	703-578-0024 571-438-6644	dale@oeii.com	Small
N00189-07-A-0042	Trade Products Corp.	Primary: Allyn Richert Alternate: David Richardson	703-502-9000	arichert@tradeproductscorp.com drichardson@tradeproductscorp.com	Small
N00189-07-A-0045	Dehler Manufacturing Co Inc.	Primary: Neicey Holloman Alternate: Bob Cantarrago	757-753-0880	neiceyholloman@yahoo.com	Small
N00189-07-A-0065	GOVSOLUTIONS Inc.	Primary: Donna Long Alternate: Jerry Barnett	757-430-7890	donna@govsolutionsinc.com gsa@govsolutionsinc.com	Small
N00189-07-A-0066	Perry & Wilson Inc.	Primary: Malcolm Wilson Alternate: Gi Gi Wilson	301-564-1112	malcolmw@mjpw.com ggwilson@mjpw.com	Small

BPA	Household and Quarters Furniture Vendor	Point of Contact	Phone	Email	Business Size
N00189-07-A-0002	Capitol Supply Inc.	Primary: Phil Harris Alternate: David Ostan	954-485-5000	Pharris@capitolsupply.com Dostan@capitolsupply.com	Small
N00189-07-A-0003	Sundrella Aluminum Products Co. Inc.	Primary: Kaycie Drennan Alternate: Ron Simonson	623-556-6833 800-825-5222	kdrennan@sundrella.com rsimonson@sundrella.com	Small
N00189-07-A-0004	Thomasville Furniture Industries Inc.	Primary: Carole Snider	336-476-2175	Csnider@thomasville.com	Small
N00189-07-A-0008	John Savoy & Son Inc.	Primary: Paula Robinson Alternate: Dave Kratzer	570-368-2424	probinson@savoyfurniture.com dkratzer@savoyfurniture.com	Small
N00189-07-A-0010	New England Woodcraft Inc.	Primary: Betsy Quigley	802-247-8211	bquigley@newwoodcraft.com	Small

N00189-07-A-0031	J Squared Inc. dba University Loft	Primary: Ventura Lopez Alternate: Terrance Bergin	317-985-3748 317-603-6489	vlopez@uloft.com tbergin@uloft.com	Small
N00189-07-A-0047	Lakewood Manufacturing Co. Inc.	Primary: Doug Widlake	800-344-1616	lakmfg@aol.com	Small
N00189-07-A-0048	Unicor Federal Prison Industries Inc.	Primary: Diane Stabinski Alternate: Cory Wheeland	757-812-2673 757-410-8408	diane.stabinski@oei-inc.com	Large
N00189-07-A-0060	United Industry of New England	Primary: Nicholas Besedin	401-421-6106	nbesedin@divon.com	Small
N00189-07-A-0061	Cmark International Inc.	Primary: Neha Mekim Alternate: Bonnie Perkins	803-699-4940	neha@cmark.org bonnie@cmark.org	Small
N00189-07-A-0063	Med Enterprises LLC dba KLN Steel Products	Primary: Mike Gittinger	210-227-4748	mike@kln.com	Small
N00189-07-A-0069	Commercial Marketing Associates Inc. dba CMA	Primary: Paul Snyder Alternate: Cindy Johnson	240-215-9700 ext 12 240-215-9700 ext 29	paul.snyder@cma-gsa.com cindy.johnson@cma-gsa.com	Small
N00189-08-A-0001	Furniture by Thurston	Primary: Mike Gittinger Alternate: Wayne Young	210-227-4747 530-272-4329	mike@kln.com wyoung@3mtf.com	Small
N00189-08-A-0002	Furniture by Thurston	Primary: Mike Gittinger Alternate: Wayne Young	210-227-4747 530-272-4329	mike@kln.com wyoung@3mtf.com	Small